TMDL FOR FECAL COLIFORMS FOR BAYOU LAFOURCHE, LOUISIANA

(SUBSEGMENT 020401)

January 2, 2004

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(SUBSEGMENT 020401)

Prepared for

EPA Region VI
Watershed Management Section
Dallas, TX 75202

Contract #68-C-02-108
Task Order #0009

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January 2, 2004

EXECUTIVE SUMMARY

The Federal Clean Water Act requires states to identify waterbodies that are not meeting water quality standards and to develop total maximum daily pollutant loads for those waterbodies. A total maximum daily load (TMDL) is the amount of a pollutant that a waterbody can assimilate without exceeding the established water quality standard for that pollutant. Through a TMDL, pollutant loads can be allocated to point sources and nonpoint sources discharging to the waterbody. This report presents a TMDL that has been developed for fecal coliforms for Bayou Lafourche (subsegment 020401).

Bayou Lafourche is located in the Barataria basin in southern Louisiana. Subsegment 020401 extends from Donaldsonville to the Intracoastal Waterway at Larose. The subsegment is long (69 mi) but the drainage area is small (10 mi^2). The majority of the flow in this subsegment is water pumped into Bayou Lafourche from the Mississippi River at Donaldsonville. Land use in the subsegment is primarily cropland (sugar cane) and urban/residential. There are numerous small point source discharges.

Subsegment 020401 was listed on the February 29, 2000 Modified Court Ordered 303(d) List for Louisiana as not fully supporting designated uses, and was ranked as priority #3 for TMDL development. The suspected causes for impairment included fecal coliforms (pathogen indicators). The designated uses for this subsegment include primary contact recreation (which applies only during May through October) and secondary contact recreation (which applies all months of the year). During summer (May through October), the water quality standards for fecal coliforms are a log mean of no more than 200/100 mL (for at least 5 samples within 30 days), no more than 25% of the values exceeding 400/100 mL on an annual basis, and no more than 10% of the values exceeding 400/100 mL during any 30-day period. During the remainder of the year, the water quality standards for fecal coliforms are a log mean of no more than 1,000/100 mL (for at least 5 samples within 30 days), no more than 25% of the values exceeding 2,000/100 mL on an annual basis, and no more than 10% of the values exceeding 2,000/100 mL during any 30-day period. The water quality standards for the log mean and for the 75th percentile were used as numerical water quality targets for this TMDL.

The TMDL is summarized in Table ES.1. This TMDL consists of a 45% reduction of summer (May through October) fecal coliform loads, and no reduction of winter fecal coliform loads. Stormwater runoff from urban areas regulated under the Phase II Stormwater Management Program are included in the WLA.

Table ES.1. Fecal coliform TMDL for Bayou Lafourche (subsegment 020401).

Source	Summer Current Load 10^8 colonies/day	Summer Reduction %	Summer Target Load 10^8 colonies/day	Winter Current Load	Winter Reduction %	Winter Target Load 10^8 colonies/day
WLA						
Point Sources	5.4	0	5.4	5.4	0	5.4
Thibodaux Stormwater	4.0	47	2.1	4.0	0	4.0
Lockport Stormwater	0.7	47	0.4	0.7	0	0.7
LA						
Wildlife	19.2	0	19.2	19.2	0	19.2
Failing Septic Systems	16.4	47	8.7	16.4	0	16.4
Other Stormwater	32.6	47	17.3	32.6	0	32.6
Mississippi Pumping	477	47	252	514	0	514
Total Load	556	45	306	592	0	592
Future Growth			38.2			74.0
MOS			38.2			74.0
TMDL			382			740

Because permit limits for point source discharges require them to meet water quality standards at the end of the pipe, the wasteload allocation (WLA) for all point source discharges consists of no reductions (both summer and winter). Because no reductions are required for point sources, the reductions in the TMDL must come from man-made nonpoint sources. A combined explicit margin of safety (MOS) and future growth factor of 20% was incorporated by calculating the percent reductions so that the log mean and 75th percentile values were no greater than 80% of the water quality standards.

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1.0 INTRODUCTION

This report present a total maximum daily load (TMDL) for fecal coliforms for Bayou Lafourche from Donaldsonville to the Intracoastal Waterway at Larose (subsegment 020401). This subsegment was listed as not fully supporting all designated uses on both the February 29, 2000 Modified Court Ordered 303(d) List for Louisiana (EPA 2000a) and the Louisiana Department of Environmental Quality (LDEQ) Final 2002 303(d) List (LDEQ 2003a). Table 1.1 shows the suspected sources and suspected causes for impairment in the Modified Court Ordered 303(d) List as well as the priority ranking. The TMDL in this report was developed in accordance with Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency's (EPA) regulations in 40 CFR 130.7. The 303(d) listings for other pollutants in this subsegment are being addressed by EPA and LDEQ in other documents.

The purpose of a TMDL is to determine the pollutant loading that a waterbody can assimilate without exceeding the water quality standard for that pollutant and to establish the load reduction that is necessary to meet the standard in a waterbody. The TMDL is the sum of the wasteload allocation (WLA), the load allocation (LA), and a margin of safety (MOS). The WLA is the load allocated to point sources of the pollutant of concern, and the LA is the load allocated to nonpoint sources (NPS). The MOS is a percentage of the TMDL that takes into account any lack of knowledge concerning the relationship between pollutant loadings and water quality.

Table 1.1 Summary of 303(d) Listing of subsegment 020401 (EPA 2000a).

Subsegment Number	Waterbody Description	Suspected Sources	Suspected Causes	Priority Ranking (1 = highest)
020401	Bayou Lafourche-Donaldsonville to Intracoastal Waterway at Larose	Minor municipal point sources Package plants (small flows) Collection system failure Inflow and infiltration Domestic wastewater lagoon Land disposal Septic tanks Other Natural sources Unknown source Flow regulations/modifications Minor industrial point sources	Mercury Organic enrichment/low DO Pathogen indicators Nutrients Pesticides Salinity/TDS/chlorides/sulfates Siltation Suspended solids Turbidity Oil and grease Noxious aquatic plants	3

2.0 BACKGROUND INFORMATION

2.1 General Description

Bayou Lafourche is located in the Barataria basin in southern Louisiana (Figure 2.1). Bayou Lafourche is a distributary of the Mississippi River, starting at Donaldsonville and flowing generally southeast for approximately 108 miles to the Gulf of Mexico. Subsegment 020401 consists of Bayou Lafourche from Donaldsonville to the Intracoastal Waterway at Larose. The portion of Bayou Lafourche that is in this subsegment has a length of approximately 69 miles and has a local drainage area of approximately 10 mi^2 (based on the subsegment boundary). The local drainage area of Bayou Lafourche is small (i.e., average width of 765 ft) because there are natural ridges along each side of the bayou.

2.2 Land Use

Land use in subsegment 020401 is predominantly residential and cropland. The primary crop grown in this area is sugarcane. Approximate percentages of each land use in the subsegment are shown in Table 2.1.

Table 2.1. Land uses in subsegment 020401 based on GAP data (USGS 1998).

Land Use	Percent of Subsegment Area
Alluvial/Wetland Forest	0.5%
Forest	2.1%
Water	8.3%
Urban Residential	47.0%
Agriculture	42.1%
Total	100.0%

2.3 Flow Characteristics

As mentioned in Section 2.1, Bayou Lafourche is a distributary of the Mississippi River, which means that prior to human intervention, some of the water in the Mississippi River naturally flowed into Bayou Lafourche. In other words, Bayou Lafourche effectively

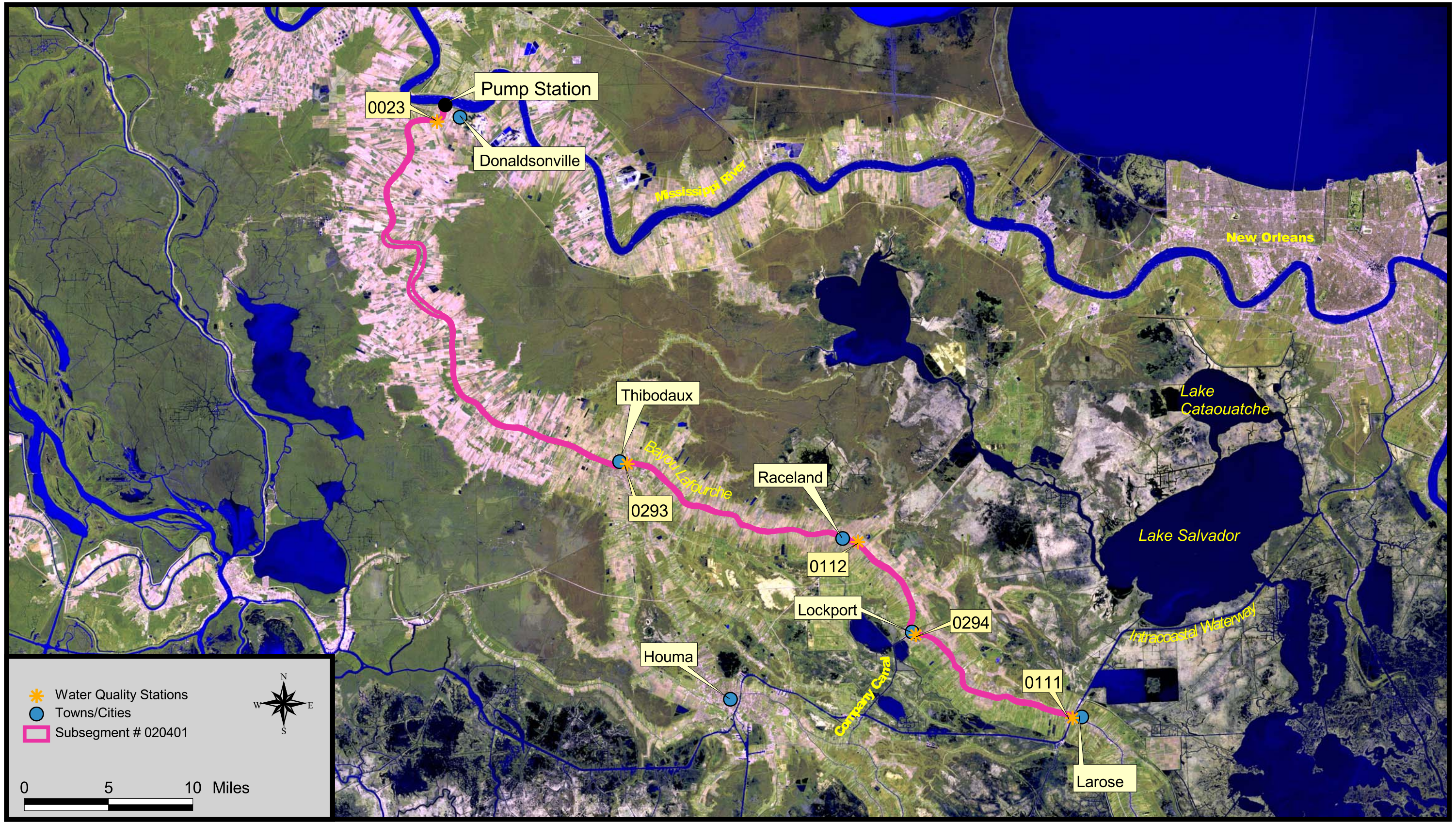


Figure 2.1. Map of Bayou Lafourche (subsegment 020401).

"distributed" water from the Mississippi River into the surrounding areas and eventually into the Gulf of Mexico. However, this natural flow pattern was cut off when levees were built along the Mississippi River many years ago. Later, a pumping station was built at Donaldsonville and began pumping water from the Mississippi River into Bayou Lafourche. This pumped water represents the primary source of flow in Bayou Lafourche.

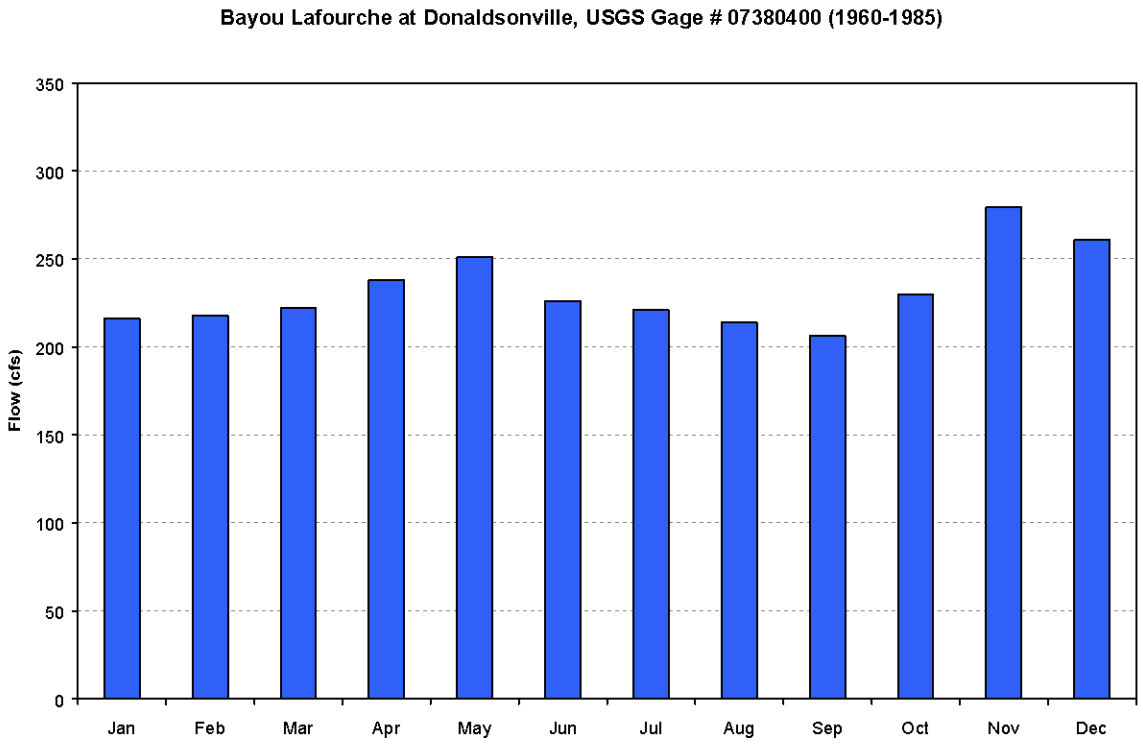
The pumping station at Donaldsonville is operated by the Bayou Lafourche Freshwater District. Water is pumped into Bayou Lafourche at a relatively constant flow rate, except for infrequent occasions when water levels in Bayou Lafourche are excessively high due to local flooding. Based on conversations with Bayou Lafourche Freshwater District personnel and USGS flow data for Bayou Lafourche at Donaldsonville and Thibodaux, the normal flow rate in Bayou Lafourche is on the order of 200 cfs (Figure 2.2). Because the pumping is relatively constant and the drainage area is small, Bayou Lafourche does not respond to rainfall and drought as much as a typical upland stream does.

There are no significant hydraulic connections between Bayou Lafourche and other waterbodies (or surrounding marshes) between Donaldsonville and Raceland. Company Canal crosses Bayou Lafourche at Lockport and the Intracoastal Waterway crosses Bayou Lafourche at Larose. The Intracoastal Waterway typically flows in an eastward direction, bringing water from the Atchafalaya River into the Barataria basin.

At Thibodaux, there is a weir in Bayou Lafourche to maintain minimum water levels for the City of Thibodaux's water supply withdrawal. The bayou is somewhat tidally influenced downstream of this weir, but it is not tidally influenced upstream of the weir.

2.4 Designated Uses and Water Quality Standards

The designated beneficial uses that have been established by the LDEQ for Bayou Lafourche (subsegment 020401) are primary contact recreation, secondary contact recreation, propagation of fish and wildlife, and drinking water supply. The primary contact recreation use applies only during May through October; the secondary contact recreation use applies during all



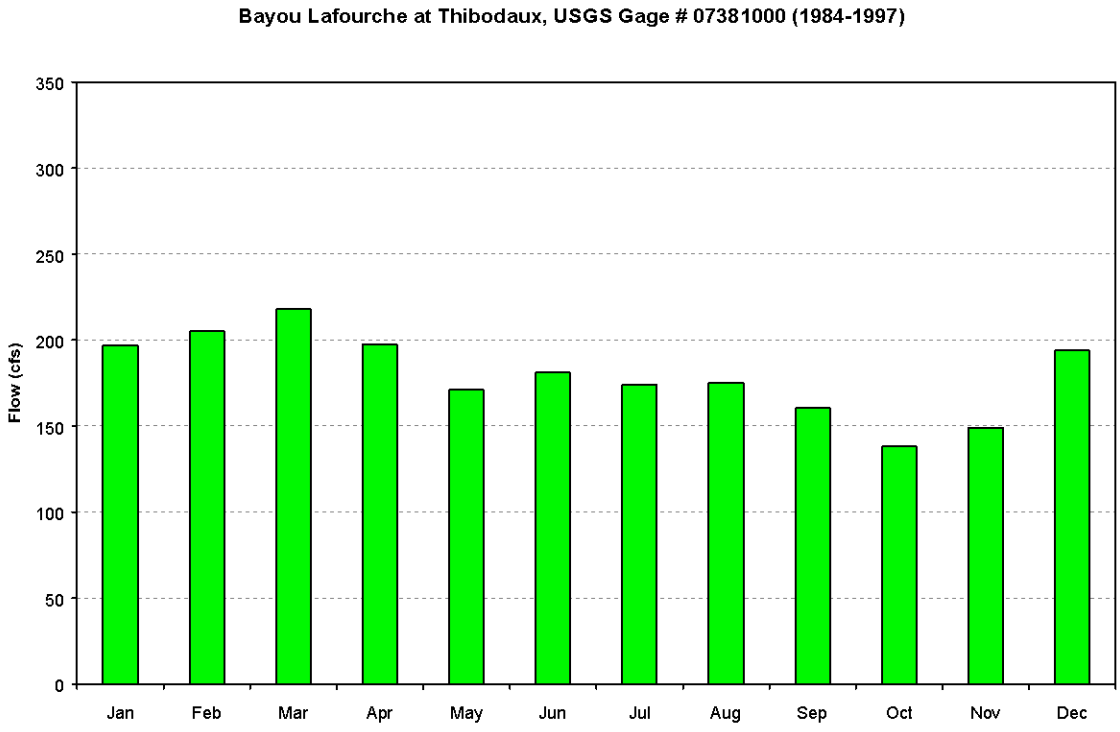


Figure 2.2. Monthly median flows for Bayou Lafourche.

months. In order to protect the primary and secondary contact recreation uses, the water quality standards for fecal coliforms have been set as follows (LDEQ 2003b):

Summer (May through October):

- The log mean of fecal coliform values shall not exceed 200/100 mL, based on not less than five samples collected during not more than 30 days.
- No more than 25% of fecal coliform values collected during a year may exceed 400/100 mL.
- No more than 10% of fecal coliform values collected during any 30-day period may exceed 400/100 mL.

Winter (November through April):

- The log mean of fecal coliform values shall not exceed 1,000/100 mL, based on not less than five samples collected during not more than 30 days.
- No more than 25% of fecal coliform values collected during a year may exceed 2,000/100 mL.
- No more than 10% percent of fecal coliform values collected during any 30-day period may exceed 2,000/100 mL.

Note: the log mean and geometric mean are mathematically equivalent.

The Louisiana water quality standards also include an antidegradation policy (LAC 33: IX.1109.A). This policy states that state waters exhibiting high water quality should be maintained at that high level of water quality. If this is not possible, water quality of a level that supports the designated uses of the waterbody should be maintained. Changing the designated uses of a waterbody to allow a lower level of water quality can only be achieved through a use attainability study.

2.5 Point Sources

A database of point source discharges in the Barataria and Terrebonne basins was previously compiled by EPA Region 6. This database was used to develop a list of point source discharges for subsegment 020401; this list is shown in Appendix A. Information on permitted flows for the facilities discharging to the subsegment was collected for a DO TMDL for this

subsegment (CADMUS 2003). For all but one of the facilities discharging to the subsegment, the EPA database did not include a list of effluent parameters being monitored. This information could be obtained through an extensive search of the LDEQ permit files in Baton Rouge, but resources were not available to do that for this TMDL. The standard industrial classification (SIC) codes provide some information concerning which discharges would have sources of fecal coliforms, but those codes are not available for many of the permits for this subsegment.

Based on conversations with LDEQ staff, fecal coliform permit limits for all point source discharges with general permits (except in oyster producing areas) are set to 200/100 mL for the monthly average and 400/100 mL for the daily maximum. The monthly average limit corresponds to the summer water quality standard for the maximum allowable log mean value during a 30-day period. The daily maximum limit corresponds to the summer water quality standard for the maximum allowable 10^{th} percentile value during a 30-day period. Essentially, the permit limits for fecal coliforms are based on meeting water quality standards at the "end of pipe" with no mixing zone.

2.6 Nonpoint Sources

Suspected nonpoint sources for subsegment 020401 have been listed in the EPA Modified Court Ordered 303(d) List for Louisiana (EPA 2000). These sources included collection system failure, inflow and infiltration, land disposal, septic tanks, natural sources, and unknown sources. "Collection system failure" apparently refers to overflows or other failures of wastewater collection systems. "Inflow and infiltration" refers to ambient stormwater leaking into sewer pipes, which can cause the wastewater collection system to overflow or it can cause the wastewater treatment plant to be overloaded (resulting in some wastewater bypassing the treatment facility and entering the receiving water without treatment).

Other discussions of nonpoint sources of pollution in the Barataria basin can be found in the LDEQ Nonpoint Source Annual Report (LDEQ 2001a) and on the web site for the LDEQ Nonpoint Source Program for the Bayou Lafourche Watershed (LDEQ 2002a). These documents both cite urban runoff and home sewage systems as nonpoint sources of fecal coliforms for Bayou Lafourche and for other parts of the Barataria basin.

2.7 Previous Water Quality Studies

There have been numerous hydrologic and hydraulic studies and several water quality studies for Bayou Lafourche. Most of the hydrologic and hydraulic studies have been performed by the U.S. Geological Survey (USGS), U.S. Army Corps of Engineers, Louisiana State University (LSU), Nicholls State University, and several other agencies and consulting firms. These studies have addressed issues related to water management alternatives (e.g., diversion rates and timing, channel modifications) and their effects on water levels, salinity, etc.

Several relevant water quality studies were identified for Bayou Lafourche; these are listed below:

1) Inventory of home sewage systems in parts of the Barataria and Terrebonne basins. This report was prepared by the South Central Planning and Development Commission (SCPDC) under contract to LDEQ.

2) "Bacteriological Criteria for Recreational Waters Along the Tangipahoa River". This report was prepared by researchers at Tulane University under contract to LDEQ. The study was conducted in the Tangipahoa River basin, which is in southeastern Louisiana. The primary emphasis of the report is the comparison of various bacteriological indicator criteria for determining whether recreational uses are being met or not. The sampling and analysis do not provide any information for estimating relative magnitudes of different sources of fecal coliforms in southern Louisiana.

3) "Survey Report for the Bayou Lafourche Low Flow Time of Travel Study". This is an LDEQ report that summarizes dye studies conducted for time of travel in June 1991 when the stream flow averaged 156 cfs.

4) "High Flow Time of Travel Study on Bayou Lafourche". This is an LDEQ report that summarizes dye studies conducted for time of travel in May 1994 when the stream flow averaged 327 cfs.

5) "Water Quality Impact of Proposed Diversion of Water from Lake Verret to Bayou Lafourche". This study was conducted in 1998 by the University of Southwestern Louisiana and it evaluates the potential water quality impacts of diverting water from Lake Verret into Bayou Lafourche via the Cancienne Canal.

6) "A Survey of the Fish Fauna of Bayou Lafourche". This study was conducted by Nicholls State University and it includes species composition, distribution, and abundance of fishes along Bayou Lafourche from August 1994 through July 1995.

3.0 CHARACTERIZATION OF EXISTING WATER QUALITY

3.1 Comparison of Observed Data to Standards

Historical fecal coliform data have been collected by LDEQ at five stations in Bayou Lafourche within subsegment 020401. These stations are listed in Table 3.1 and their locations are shown in Figure 2.1. Table 3.1 also shows a comparison of observed fecal coliform data and water quality standards. The water quality standards used for the comparison are the values that should not be exceeded more than 25% of the time on an annual basis (400/100 mL for summer and 2,000/100 mL for winter as described in Section 2.4). The standards used in this comparison are the same as the criteria used by LDEQ in their assessment methodology presented in their 305(b) report (LDEQ 2002b). As shown in Table 3.1, the percent exceedance during winter was less than 25% for all five stations; therefore, the designated use of secondary contact recreation is being supported during winter. For summer, though, the percent exceedance was greater than 25% for three of the five stations; this indicates that the designated use of primary contact recreation is not being met throughout the entire subsegment. It is not known why percent exceedances are higher for the three upper stations (0023, 0293, and 0112) than for the two lower stations (0294 and 0111). Both of the two lower stations are located near waterbodies that cross Bayou Lafourche (Company Canal crosses at Lockport and the Intracoastal Waterway crosses Larose); these waterbodies could possibly be bringing other water into Bayou Lafourche. Also, the data for station 0111 are only for one year (2000), which was a dry year in which fecal coliform contributions from storm runoff were probably less than usual. If fecal coliform data had been collected at station 0111 for the entire 1991-2000 period, the data for that station might be similar to data for the other stations.

3.2 Trends and Patterns in Observed Data

The LDEQ historical fecal coliform data for 1991-2000 are shown graphically in Figures 3.1 through 3.5 (all figures for Section 3 are located in Appendix B). These plots show the large variability that is typical for most fecal coliform data. The data for station 0293 (at Thibodaux) appear to have a slight downward trend, but data for the other stations do not show

Table 3.1. Summary of LDEQ fecal coliform data for Bayou Lafourche (subsegment 020401).

Station No.	Description	Period of Record Used	# of Data	Percent of Values Exceeding Standard for 75th Percentile		Support Designated Use?	
				Summer	Winter	Summer	Winter
0023	Bayou Lafourche near Donaldsonville	1991-1998	42	58%	9%	No	Yes
0293	Bayou Lafourche at Thibodaux	1991-2000	71	47%	6%	No	Yes
0112	Bayou Lafourche at Raceland	1991-1998	41	42%	18%	No	Yes
0294	Bayou Lafourche at Lockport	1991-1998	41	21%	5%	Yes	Yes
0111	Bayou Lafourche at Larose	2000	12	14%	0%	Yes	Yes

Notes: 1. For summer, the 75th percentile standard is 400/100 mL (primary contact recreation).
2. For winter, the 75th percentile standard is 2000/100 mL (secondary contact recreation).
3. For stations 0023, 0112, and 0111, data exist prior to 1991 but were not used.

any long terms trends. The apparent downward trend at station 0293 could be influenced by the fact that the last several years of data were collected during dry years. As mentioned above, the fecal coliform contributions from storm runoff were probably less than usual during those years

To provide further insight, these fecal coliform data were plotted against 3-day antecedent precipitation as shown in Figures 3.6 through 3.10. In general, most of the fecal coliform counts during wet conditions tended to be relatively high. However, there were not strong correlations between fecal coliform counts and precipitation.

Also, the fecal coliform data were plotted by day of the year to examine any seasonal patterns (Figures 3.11 through 3.15). From visual observations of these plots, the summer values tended to be slightly higher than winter values for some of the stations. This may or may not be related to the fact that the normal monthly precipitation amounts are higher during May through September (5 to 8 inches per month) than during other months (3 to 6 inches per month). There are definitely more values above the log mean water quality standard during summer than during winter.

4.0 TMDL DEVELOPMENT

4.1 Seasonality and Critical Conditions

Federal regulations in 40 CFR 130.7 require TMDLs to include seasonal variations and take into account critical conditions for stream flow, loading, and water quality parameters. For this TMDL, seasonality was accounted for by developing a seasonal TMDL based on the water quality standards that are applicable for each season. Additionally, the observed fecal coliform data were plotted by day of the year to check for any seasonal patterns (see Section 3.2).

The requirement to account of critical conditions is intended to make sure that water quality standards are maintained not just for average conditions, but also for critical conditions that occur infrequently. This limits the frequency of occurrence of standards violations to an acceptably low level. For most water quality parameters, the water quality standard is listed as a single value that must be maintained at all times except when conditions are more critical than a certain set of conditions. For example, the DO standards for non-tidal waterbodies in Louisiana are applicable at all times except when the flow is less than the 7Q10 flow. Therefore, DO TMDLs require the estimation of allowable loads for 7Q10 flow conditions.

For fecal coliforms, though, the water quality standards include values that should not be exceeded more than 25% of the time based on all data collected during applicable periods of the year (i.e., based on data collected during both critical and non-critical conditions). Because they are written this way, these standards allow a fecal coliform TMDL to be developed by looking at all conditions within applicable periods of the year and evaluating the percent of values exceeding the standard. For this TMDL, critical conditions for flow, temperature, etc. were not determined, but critical conditions were accounted for by setting the numeric water quality target to the standards that should not be exceeded more than 25% of the time. The 75^{th} percentile of water quality values was compared to the numeric target to determine compliance with water quality standards.

4.2 Assessment of Pollutant Sources

A list of sources of fecal coliforms to Bayou Lafourche was developed and the relative contribution of each source was estimated. The potential sources, their locations, and miscellaneous comments concerning the sources are listed in Table 4.1.

Table 4.1. Sources of fecal coliforms to Bayou Lafourche (subsegment 020401).

Source	Location	Comments
Point sources	Distributed along the entire length of the subsegment	Should not cause any violations of water quality standards (permit limits are based on meeting standards at end of pipe)
Water pumped from Mississippi River	at Donaldsonville	Median values of fecal coliform counts for the Mississippi River east of Plaquemines (LDEQ station 0319) were 130/100 mL for summer and 140/100 mL for winter (based on 1991-2002 data)
Failing septic systems	Distributed along the entire length of the subsegment	Considered to be significant by LDEQ and SCPDC (see Section 2.6). Accurate estimate of number of failing septic systems could not be obtained for this TMDL.
Runoff from residential and urban areas	Distributed along the entire length of the subsegment	Considered to be significant by LDEQ and SCPDC (see Section 2.6). Urban runoff is most significant within towns (Donaldsonville, Thibodaux, Raceland, and Larose).
Runoff from cropland and pasture	Distributed along the entire length of the subsegment	Expected to be negligible. Pasture is negligible percentage of total drainage area. No known land application of manure or sludge from wastewater treatment plants in this subsegment.
Wildlife and waterfowl	Distributed along the entire length of the subsegment	Expected to be minor. No large forested areas for wildlife. Does not attract large numbers of waterfowl.

The EPA Bacterial Indicator Tool spreadsheet (EPA 2000b) was used to estimate relative contributions of different sources of fecal coliforms for Bayou Lafourche. The spreadsheet is designed to estimate fecal coliform accumulation rates for input to a watershed model such as HSPF. For this TMDL, though, the spreadsheet was used to estimate relative loadings to the stream. To estimate the percentage of fecal coliforms that actually enter the stream would require a detailed analysis such as applying the HSPF model to the Bayou Lafourche drainage area. A detailed analysis was not feasible for this TMDL due to the lack of available data and resources. Therefore, for simplicity, it was assumed that all fecal coliforms accumulating on the land

surface would enter the stream. A printout of the spreadsheet showing values used for Bayou Lafourche is included in Appendix C.

For runoff from built-up (urban and residential) areas, accumulation rates from Horner (1992) were used. Subcategories of urban land uses (commercial, mixed, residential, transportation and utilities) were assigned different accumulation rates. Incorporated areas within US Census defined urban areas are subject to Phase II stormwater regulations (EPA 2000c). Approximately half the subsegment is apart of the US Census defined Houma urban area (US Census 2002). Thibodaux and Lockport are the only incorporated areas in the Houma urban area in the subsegment (US Census 2002); therefore, fecal coliform accumulations from their urban areas were classified as point sources to be consistent with the Phase II storm water regulations. The lengths of areas along the subsegment associated with each community were used to determine the urban land uses for each point source and the nonpoint urban sources in the subbasins of the subsegments. Subcategories of urban land uses were split among the point and nonpoint urban areas based on the proportion of the length of the areas to the subbasin length. It was estimated that Thibodaux accounts for approximately 60% of the commercial and mixed urban land uses in its subbasin, and 10% of the residential and transportation and utilities urban land uses. Lockport was estimated to account for approximately 25% of all urban land uses in its subbasin.

For contributions from wildlife and waterfowl, fecal coliform accumulation rates were based on the animal density, which was assumed to be five animals per square mile for each animal included in the spreadsheet (ducks, geese, deer, beaver, raccoons, and "other animals").

For failing septic systems, fecal coliform contributions were calculated based on the assumptions that 40% of septic systems are failing, each failing septic system serves an average of 2.5 people, and each system generates 70 gal/day per person with a fecal coliform concentration of 10,000/100 mL. An accurate count of the number of failing septic systems in the subsegment is currently not available. The 40% failure rate was used in approved fecal coliform TMDLs for Mississippi (MDEQ 1999a,b). A report by the South Central Planning and Development Commission (SCPDC) reports an inventory of home sewage systems that was developed for LDEQ for parts of the Barataria and Terrebonne basins including Bayou

Lafourche (SCPDC 2001). Based on the GIS data collected for this report, SCPDC has determined that there are approximately 618 individual sewer treatment facilities located in subsegment 020401 (personal communication, 7/24/03, Scott Leger, SCPDC). The flow rate and fecal coliform count for failing septic systems were default values in the spreadsheet based on information from Horsley & Witten (1996).

The spreadsheet was modified slightly to include fecal coliform contributions from pumped inflows and point sources. For pumped inflows from the Mississippi River, the contribution of fecal coliforms was estimated by multiplying the median fecal coliform values for the Mississippi River during summer and winter (130/100 mL and 140/100 mL, respectively) by a typical pumping rate of 150 cfs (the pumping rate was based on conversations with personnel operating the pumps). For point source discharges, the contribution of fecal coliforms was estimated by multiplying the monthly average general permit limit for fecal coliforms (200/100 mL in the summer and 1000/100 mL in the winter) by the sum of the discharge permitted flows.

A summary of the estimated relative contributions of point sources and nonpoint sources of fecal coliforms is shown in Table 4.2. The two largest sources are water pumped from the Mississippi River and runoff from residential and urban areas. Although failing septic systems have been considered to be a significant nonpoint source (see Section 2.6), they were estimated to represent less of the total load than these two sources.

Table 4.2. Relative magnitudes of different sources of fecal coliforms for subsegment 020401.

Source	Percent of total loading	
	Summer	Winter
Point sources	1.0%	0.9%
Water pumped from Mississippi River	87.2%	88.0%
Failing septic systems	1.5%	1.4%
Runoff from residential and urban areas	6.8%	6.4%
Wildlife and waterfowl	3.5%	3.3%

4.3 TMDL

This TMDL was developed by calculating a percent reduction from existing levels and then estimating maximum allowable "loads" of fecal coliforms (i.e., number of fecal coliforms per unit of time). The overall percent reduction needed in fecal coliforms was determined by taking the observed data for each season and multiplying them by a reduction factor until the log mean and 75th percentile values of the data were less than the target values. Target values were set to 80% of the seasonal water quality standards (to incorporate a 10% explicit margin of safety and 10% future growth component). This procedure of calculating the overall percent reduction was repeated for each LDEQ monitoring station with fecal coliform data within this subsegment. The percent reduction was applied only to observed data that were greater than the log mean water quality standard (200/100 mL for summer and 1000/100 mL for winter) because it was not considered feasible to reduce fecal coliform counts that were already below the water quality standard. For summer, the required percent reductions at the five water quality monitoring stations ranged from 0% to 77%, with an average of 45%. No reductions were required for winter. These calculations are shown in Appendix D and the results are summarized in Table 4.3.

Table 4.3. Summary of percent reductions needed to meet standards.

Station No.	Station Description	Percent Reduction Needed	
		Summer	Winter
0023	Bayou Lafourche near Donaldsonville	77%	0%
0293	Bayou Lafourche at Thibodaux	75%	0%
0112	Bayou Lafourche at Raceland	71%	0%
0294	Bayou Lafourche at Lockport	0%	0%
0111	Bayou Lafourche at Larose	0%	0%

This methodology (applying a percent reduction to individual data points) addresses the variability associated with both the observed data and the water quality standards. The water quality standards specify that the log mean should be calculated using not less than five samples collected during not more than 30 days. Although none of the fecal coliform data being used in this TMDL consisted of five samples collected within a 30-day period, it was still considered useful to calculate the percent reductions based on meeting the log mean standard as well as the

75th percentile standard. Requiring the data to meet both standards made the analysis more conservative.

Table 4.4 shows an estimate of the current fecal coliform load to the subsegment, along with loads that would result from applying the reductions specified for the TMDL. These reductions are discussed below.

Table 4.4. TMDL for Bayou Lafourche Subsegment 020401.

Source	Summer Current Load 10^8 colonies/day	Summer Reduction %	Summer Target Load 10^8 colonies/day	Winter Current Load	Winter Reduction %	Winter Target Load 10^8 colonies/day
WLA						
Point Sources	5.4	0	5.4	5.4	0	5.4
Thibodaux Stormwater	4.0	47	2.1	4.0	0	4.0
Lockport Stormwater	0.7	47	0.4	0.7	0	0.7
LA						
Wildlife	19.2	0	19.2	19.2	0	19.2
Failing Septic Systems	16.4	47	8.7	16.4	0	16.4
Other Stormwater	32.6	47	17.3	32.6	0	32.6
Mississippi Pumping	477	47	252	514	0	514
Total Load	556	45	306	592	0	592
Future Growth			38.2			74.0
MOS			38.2			74.0
TMDL			382			740

4.4 Wasteload Allocation

As discussed in Section 2.5, LDEQ's policy is to set permit limits for fecal coliforms no higher than water quality standards (i.e., standards are met at end of pipe). Therefore, as long as point source discharges contain fecal coliforms levels at or below these permit limits, they should not cause any violations of water quality standards for fecal coliforms. For this TMDL, the WLA consists of no reductions for point sources.

As discussed in Section 4.2, fecal coliforms from runoff from urban land uses associated with Thibodaux and Lockport are included in the wasteload allocation for this TMDL because they are regulated under the Phase II Stormwater Management Program. Because reductions are not being applied to all fecal coliform sources, in order to achieve the 45% load reduction a 47%

reduction is applied to those sources that are being reduced, including the urban runoff form Thibodaux and Lockport.

4.5 Load Allocation

Based on the assessment of pollutant sources in Section 4.2, it will be impossible to achieve a 45% reduction in fecal coliform levels without reducing the inputs to Bayou Lafourche from the Mississippi River (Table 4.4). However, this analysis assumed that fecal coliform levels in the Mississippi River were below the log mean water quality standards. Therefore, the Mississippi River water should not be causing any violations of water quality standards in Bayou Lafourche and no reductions should be required for loading from the Mississippi River. This indicates that the assessment of pollutant sources in Section 4.2 is likely underestimating contributions from sources other than the Mississippi River water (e.g., septic systems, urban runoff, waterfowl and wildlife). The TMDL shown in Table 4.4 assumes a 47% reduction in fecal coliform loads from pumped Mississippi River water.

The portion of the total nonpoint source loading that is natural (rather than man-induced) is difficult to estimate because the loading from the Mississippi River inflow includes both natural and man-induced loading. The natural loading that originates from within the Bayou Lafourche subsegment would be due primarily to wildlife and waterfowl, which represented less than 3% of the total loading. No reduction was assigned to this load.

The TMDL assumes a 47% reduction in the known man-induced fecal coliform loads to the subsegment (urban and residential runoff, and failing septic systems).

4.6 Margin of Safety

Section 303(d) of the Federal Clean Water Act and EPA's regulations at 40 CFR 130.7 both require the inclusion of a margin of safety in the development of a TMDL. An explicit combined margin of safety and future growth factor of 20% was incorporated in this TMDL by calculating the percent reductions so that the log mean and 75th percentile values were no greater than 80% of the seasonal water quality standards. In the TMDL, both the margin of safety and the future growth factor were set to 10% of the TMDL.

5.0 OTHER RELEVANT INFORMATION

Utilizing funds under Section 106 of the Federal Clean Water Act and under the authority of the Louisiana Environmental Quality Act, LDEQ has established a program for monitoring the quality of the state's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations, utilizing appropriate sampling methods and procedures for ensuring the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, to develop a long-term database for water quality trend analysis, and to monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program is used to develop the state's biennial 305(b) report (*Water Quality Inventory*) and the 303(d) list of impaired waters. This information is also utilized in establishing priorities for the LDEQ nonpoint source program.

LDEQ has implemented a watershed approach to surface water quality monitoring. Through this approach, the entire state is sampled over a five-year cycle with two targeted basins sampled each year. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the five-year cycle. Sampling is conducted on a monthly basis or more frequently if necessary to yield at least 12 samples per site each year. Sampling sites are located where they are considered to be representative of the waterbody. Under the current monitoring schedule, targeted basins follow the TMDL priorities. In this manner, the first TMDLs will have been established by the time the first priority basins will be monitored again in the second five-year cycle. This will allow LDEQ to determine whether there has been any improvement in water quality following implementation of the TMDLs. As the monitoring results are evaluated at the end of each year, waterbodies may be added to or removed from the 303(d) list. The sampling schedule for the current five-year cycle follows.

2003 – Mermentau and Vermilion-Teche River Basins
2004 – Calcasieu and Ouachita River Basins
2005 – Barataria and Terrebonne Basins
2006 – Lake Pontchartrain Basin and Pearl River basin
2007 – Red and Sabine River Basins

(Atchafalaya and Mississippi rivers will be sampled continuously.)

6.0 FUTURE WATERSHED ACTIVITIES

Point source wasteload allocations will be implemented through LPDES permit procedures.

In Louisiana, nonpoint source load allocations will be addressed through the LDEQ Nonpoint Source Management Program. The *Louisiana's Nonpoint Source Management Plan* (Plan) (LDEQ 2000) states that TMDLs are being developed through a close relationship between LDEQ and EPA Region 6. It further states that, "management strategies outlined within this document (both statewide and watershed) will be implemented in each of the watersheds where water quality problems have been attributed to nonpoint sources of pollution." On page ii, Objective 3 of the watershed management strategies is to "utilize pollutant load reductions of the TMDL to develop nonpoint source pollution reduction strategies for each of the watersheds ... that have water quality problems identified." Also, Objective 7 provides a tracking process for evaluating progress in reduction in loadings of fecal coliform bacteria.

The Plan includes a discussion of a number of nonpoint source activities and provides Best Management Practices (BMPs) that can be used to achieve the nonpoint source load reductions for fecal coliform as established in the TMDLs. The Plan broadly discusses programs including agriculture, forestry, home sewerage systems, hydromodification, urban runoff, construction, and resource extraction.

The Plan provides fourteen different BMPs that can be used to reduce fecal coliform loads. Also provided with each of these BMPs is an evaluation of the effectiveness of the BMP given as a high, medium, or low ranking. Additional evaluations should be conducted to determine the most likely source of fecal contamination in this watershed and to identify localized hot spots to be targeted for effective BMP implementation. These and other BMPs may be implemented at a scale adequate to achieve the load reductions as established in the TMDL.

7.0 PUBLIC PARTICIPATION

When EPA establishes a TMDL, federal regulations require EPA to publicly notice and seek comment concerning the TMDL. These TMDLs have been prepared under contract to EPA. After development of this TMDL, EPA and/or a designated state agency will commence preparation of a notice seeking comments, information, and data from the general public and affected public. If comments, data, or information are submitted during the public comment period, then EPA may revise the TMDL accordingly. After considering public comment, information, and data, and making any appropriate revisions, EPA will transmit the revised TMDL to the LDEQ for implementation and incorporation into LDEQ's current water quality management plan.

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APPENDIX A

List of Point Source Discharges

LIST OF POINT SOURCE DISCHARGES FOR SUBSEGMENT 020401 (BAYOU LAFOURCHE)

FILE_NUM	NPDES	LPDES	COMPANY	FACILITY	LOCATION	FAC_TYPE	REC_WATER	SIC
LAG530322			LAFOURCHE PAR SCH BD	LAFOURCHE PH ALTERNATIVE SCH N CAMPUS	THIBODAUX 2134 HWY 308	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG530318			LAFOURCHE PAR COUNCIL	VALENTINE PONTOON BRIDGE	VALENTINE HWY 308 & HWY 1	BRIDGE	DIRECTLY INTO BAYOU LAFOURCHE	4952
LAG530043			AUCOIN'S SEWER UTILITY SERVICE	ELMFIELD SUBDIVISION	LABADIEVILLE, OFF HWY 308	4,000 GPD OX POND	BAYOU LAFOURCHE	4952
LAG530874			JOEYS SEAFOOD & LOUNGE		RACELAND 5365 HWY 1	RESTAURANT/LOUNGE	BAYOU LAFOURCHE	4952
LAG540861			LAFOURCHE PAR RECREATION DIST 2	EMERGENCY RECREATION & COMM CNTR	RACELAND TEXAS ST & SENIOR CITIZENS DR	COMMUNITY CNTR	GAZZO CANAL & BAYOU LAFOURCHE	4952
LAG110037			ELRAY KOCKE SVC INC	HWY 1 CONCRETE PLT	DONALDSONVILLE, HWY 1 S	CONCRETE PLT	OLD BAYOU MCCALL-BAYOU LAFOURCHE	3273
LAG540147			AUCOIN'S SEWER UTILITY SERVICE	AUCOINS TRAILER PARK	DONALDSONVILLE, OFF HWY 308	12,000 GPD RESIDENTIAL STP	BAYOU LAFOURCHE	4952
LAG560032			AUCOIN'S SEWER UTILITY SERVICES	ST JUDE SUBD SEWER SYS	DONALDSONVILLE, LA 18	35,200 GPD (2) MECH. STPS	BAYOU NAPOLEON-BAYOU LAFOURCHE	4952
LA0100676			TALLULAH WATER CO	FKA PEOPLES WATER CO	DONALDSONVILLE, 303 MISSISSIPPI ST	WATER TREATMENT PLANT	BAYOU LAFOURCHE	4941
LAG560027			AUCOIN'S SEWER UTILITY SERVICE	MAGNOLIA SUBD	OFF HWY 308 BTWN NAPOLEONVILLE & DONALD	RESIDENTIAL STP	BAYOU NAPOLEON TO BAYOU LAFOURCHE	4952
LAG540154			AUCOIN'S SEWER UTILITY SERVICE	KINGSTON SUBD	LABADIEVILLE, OFF HWY 1	18,000 GPD RESIDENTIAL STP	BAYOU LAFOURCHE	4952
LAG540155			AUCOIN'S SEWER UTILITY SERVICE	LABADIE ESTATES SUBD	LABADIEVILLE, OFF HWY 389	17,600 GPD RESIDENTIAL STP	BAYOU NAPOLEON-BAYOU LAFOURCHE	4952
LAG530679			ROUSES ENTERPRISES INC	RACELAND STORE #3	RACELAND 3880 HWY 1	GROCERY STORE/STP	BAYOU LAFOURCHE	4952
LAG530185			ECONOMY INN		LOCKPORT 5656 HWY 1	MOTEL	BAYOU LAFOURCHE	4952
LAG540460			LAFOURCHE PH SCH BD	RACELAND LOWER ELEM SCH	RACELAND 4101 HWY 308 S	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG560112			LAFOURCHE PH SCH BD	RACELAND JR HIGH SCH	RACELAND 3737 HWY 308	PUBLIC SCH	BAYOU LAFOURCHE	4952
LAG540454			LAFOURCHE PAR SCH BD	CENTRAL LAFOURCHE HIGH SCHOOL	MATHEWS, 4820 HWY 1	PUBLIC SCHOOL	BAYOU LAFOURCHE	4952
LA0098060			THIBODAUX CITY OF	THIBODAUX WTR WORKS	THIBODAUX, .2 M N OF CANAL ST & HWY 308	WATER PLANT	PIPE-BAYOU LAFOURCHE-GULF OF MEXICO	4941
LAG540498			MATHEWS LA COMMERCIAL PROP DEV CO	WAL-MART SHOPPING CENTER	MATHEWS, LA HWY 1	EXTENDED AERATION	BAYOU LAFOURCHE	4952
LAG530559			LITTLE FRENCH MARKET, INC		THIBODAUX, 212 BAYOU RD	RESTAURANT STP	BAYOU LAFOURCHE	4952
LAG530268			JB LEVERT LAND CO INC	USDA BLDG	THIBODAUX HWY 308	220 GPD HOOT AEROBIC TREATMENT	BAYOU LAFOURCHE	4952
LAG530407			PAPPYS FRIED CHICKEN		RACELAND, 3679 LA 1	RESTAURANT STP	BAYOU LAFOURCHE	4952
LA0107361			CAD INC (CARWASH)		RACELAND, HWY 1 ACROSS FROM AYO ST	CARWASH	BAYOU LAFOURCHE VIA UNNAMED DITCH	7542
LAG540364			HOUSING AUTHORITY OF LAFOURCHE PH	LAFOURCHE HOUSING PROJECT	THIBODAUX, ON LA HWY 308, LASSEIGNE ROAD	STP	BAYOU LAFOURCHE	4952
LAG540852			MCDONALDS CORP THIBODAUX		THIBODAUX,	FAST FOOD RESTAURANT	BAYOU LAFOURCHE - DONALDSONSON TO I	4952
LAG530887			SITA INC	DEAUVILLE MOTEL & LOUNGE	THIBODAUX 1717 ST MARY ST	MOTEL	BAYOU LAFOURCHE	4952
LAG560005			AUCOIN'S SEWER UTILITY SERVICE	MAGNOLIA SUB	KLOTZVILLE, NORTH OF, ON HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
LA0063303			LAFOURCHE PARISH HOUSING AUTHORITY	THIBODAUX, LA-80-7-A	THIBODAUX, LASSEIGNE RD. OFF HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16165		LAG750203	ABCD REALITY INC	WAG-A-PAK VIII (THIBODAUX)	THIBODAUX, 108 E BAYOU RD (HWY 308)	CAR WASH	BAYOU LAFOURCHE	
LAG530005			AMERICAN BIOCHEMICAL CORPORATION	LOCKPORT	LOCKPORT, 8240 HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP4407		LAG750234	ARABIE TRUCKING CO	THIBODAUX	THIBODAUX, 1900 HWY 1	VEHICLE REPAIR	BAYOU LAFOURCHE	
WG010284		LAG530043	AUCOIN'S SEWER UTILITY SERVICE	ELMFIELD SUB	LABADIEVILLE, HWY 308	OXIDATION POND	BAYOU LAFOURCHE	
WG020059		LAG540154	AUCOIN'S SEWER UTILITY SERVICE	KINGSTON SUB	LABADIEVILLE, HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG020054	LA0083062	LAG540155	AUCOIN'S SEWER UTILITY SERVICE	LABADIE ESTATES SUBD	LABADIEVILLE, HWY 398	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG010062		LAG530068	BECK'S	RACELAND	RACELAND, 4293 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	

FILE_NUM	NPDES	LPDES	COMPANY	FACILITY	LOCATION	FAC_TYPE	REC_WATER	SIC
WG020905		LAG540185	BOB DEAN ENTERPRISES INC	RACELAND MANOR	RACELAND, 4302 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP2767	LAR00B997	LA0084069	BOLLINGER SHIPYARDS LOCKPORT, LLC	LOCKPORT	8365 LA HIGHWAY 308, 4 MI S OF LOCKPORT	SHIPYARD	BAYOU LAFOURCHE	
WP2047		LAG750253	BOLOTTE CARWASH	LABADIEVILLE	LABADIEVILLE, 2564 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010415		LAG530100	BURGER KING CORP	RESTAURANT #6057	MATHEWS, 4870 HWY 1	RESTAURANT	BAYOU LAFOURCHE	
WP3594			CAJUN WAGON	THIBODAUX	THIBODAUX, 1249 HWY 1	CRAWFISH	BAYOU LAFOURCHE	
LAR05M358			CAMECO IND INC	CAMECO IND INC	THIBODAUX, P.O. BOX 986	INDUSTRIAL PRODUCTS	BAYOU LAFOURCHE	
WP3518	LA0088714	LAG530672	BAYOU FOOD STORES INC/CANAL REFINING CO	SUGARLAND CANAL STATION, RACELAND	RACELAND 4559 HWY 1 S	SERVICE STATION	BAYOU LAFOURCHE	
LA0115177			CENTRAL CRUDE INC	VALENTINE TERMINAL	9793 HIGHWAY 308	OIL STORAGE	BAYOU LAFOURCHE	
WG010218		LAG530127	CHINA GARDENS	FORMER GWEN WONG RESTAURANT	THIBODAUX, 1400 ST MARY STREET	EXTENDED AERATION (4510 GPD)	BAYOU LAFOURCHE	
WG020794		LAG540498	COMMERCIAL PROPERTIES DEV CORP	MATHEWS SHOPPING CENTER	MATHEWS, HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP4367			EXXON PIPELINE CO	RACELAND STORAGE FACILITY	RACELAND	OIL STORAGE	BAYOU LAFOURCHE	
WP4146	LA0095788		GAUBERT OIL CO INC	GAUBET OIL FOOD MART	THIBODAUX, 1501 ST. MARY HWY	SERVICE STATION	BAYOU LAFOURCHE	5411
WP4732	LAR05M053	LA0102989	HALTER MARINE	HALTER MARINE LOCKPORT	LOCKPORT, HWY 308	SHIPYARD	BAYOU LAFOURCHE	3731
GP14442		LAG75018	HILL CITY OIL CO INC	EXXON JUBILEE #610	105 HWY 70 SPUR	SERVICE STATION	BAYOU LAFOURCHE	
WP0838			J R ENTERPRISES	WET SPOT CARWASH	MATHEWS, HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010581		LAG530272	JIM'S FROSTOPS INC	RACELAND FROSTOP	RACELAND, HWY 1 AND ST. LOUIS ST	RESTAURANT	BAYOU LAFOURCHE	4952
WG080179		LAG750171	JOEY'S CAR WASH	LOCKPORT	LOCKPORT, 5609 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WG010063		LAG530290	LA DEPT OF TRANS & DEVELOPMENT	BAYOU LAFROUCHE BRIDGE, LOCKPORT	LOCKPORT, ACR BAYOU LAFOURCHE LA3220	BRIDGE	BAYOU LAFOURCHE	4952
LAG530307			LA DEPT OF TRANS & DEVELOPMENT	LAROSE PONTOON BRIDGE	ROUTE LA 310 OVER BAYOU LAFOURCHE,LAROSE	BRIDGE	BAYOU LAFOURCHE	
WG020423	LA0063303	LAG540364	LAFOURCHE PARISH HOUSING AUTHORITY	RACELAND FACILITY	RACELAND, HWY 308	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16095		LAG540861	LAFOURCHE PARISH RECREATION DIST #2	RACELAND	RECREATION DRIVE, NEAR POST OFFICE	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG020923		LAG540463	LAFOURCHE PARISH SCHOOL BOARD	ST CHARLES ELEMENTARY SCHOOL	ST CHARLES, 5 MI S @ 1690 HWY 1	SEWERAGE	BAYOU LAFOURCHE	
WP4306			LINCOLN BIG 3 INC	THIBODAUX	THIBODAUX, HWY 308	ACETYLENE PRODUCTION	BAYOU LAFOURCHE	
WG010079		LAG530342	LOCKPORT VOLUNTEER FIRE DEPT	308 STATION	LOCKPORT, 1.5 MI S OF VALENTINE BRG LA 1	SEWERAGE PLANT	BAYOU LAFOURCHE	
WG010078		LAG530343	LOCKPORT VOLUNTEER FIRE DEPT	VALENTINE STATION	LOCKPORT, RT 1, BOX 183A, S OF VALENTINE	SEWERAGE PLANT	BAYOU LAFOURCHE	
WP5103			LYTAL MARINE OPERATORS INC	LOCKPORT	LOCKPORT	MARINE VESSEL	BAYOU LAFOURCHE	
WP2236			MR BT'S MOBILE HOME PARK	THIBODAUX	THIBODAUX	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP16128	LA0107174		PELTS & SKINS EXPORT LTD	LOCKPORT	502 EAST MAIN, LOCKPORT	ALLIGATOR FARM	BAYOU LAFOURCHE	2091
WG020565		LAG530439	RACELAND DAIRY KOOL	RACELAND	RACELAND, 3821 HWY 1	SEWERAGE PLANT	BAYOU LAFOURCHE	4952
GP12658		LAG530461	RICHARD LEDET'S TRAILER PARK	LOCKPORT	LOCKPORT, 211 - 215 N WILLOW STREET	SEWERAGE PLANT	BAYOU LAFOURCHE	
GP17026		LAG540953	ROGERS TRAILER PARK	LOCKPORT	LOCKPORT, OFF HWY 308 NEAR PANKYS	OXIDATION POND	UNNAMED DITCH TO BAYOU LAFOURCHE	6515
WP1979		LAG750359	SCRUBBS CARWASH	RACELAND	RACELAND, 3895 HWY 1	CAR WASH	BAYOU LAFOURCHE	
WP1369		LAG330192	TRANSWORLD EXPLORATION & PRODUCTION	LOCKPORT	LOCKPORT	E&P	BAYOU LAFOURCHE	
LAR05M268			WALMART OF SOUTH LA	WALMART OF SOUTH LA	RACELAND, 143 HWY 3199	DEPARTMENT STORE	BAYOU LAFOURCHE	
LA0094978			WASTE MANAGEMENT OF LOUISIANA	LAFOURCHE RECYCLING CENTER	RACELAND, 143 HWY 3199	(SW)DISPOSAL	BAYOU LAFOURCHE	4953

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APPENDIX B

Figures 3.1 Through 3.15

Figure 3.1. Long Term Plot of Fecal Coliform Data for Station 0023

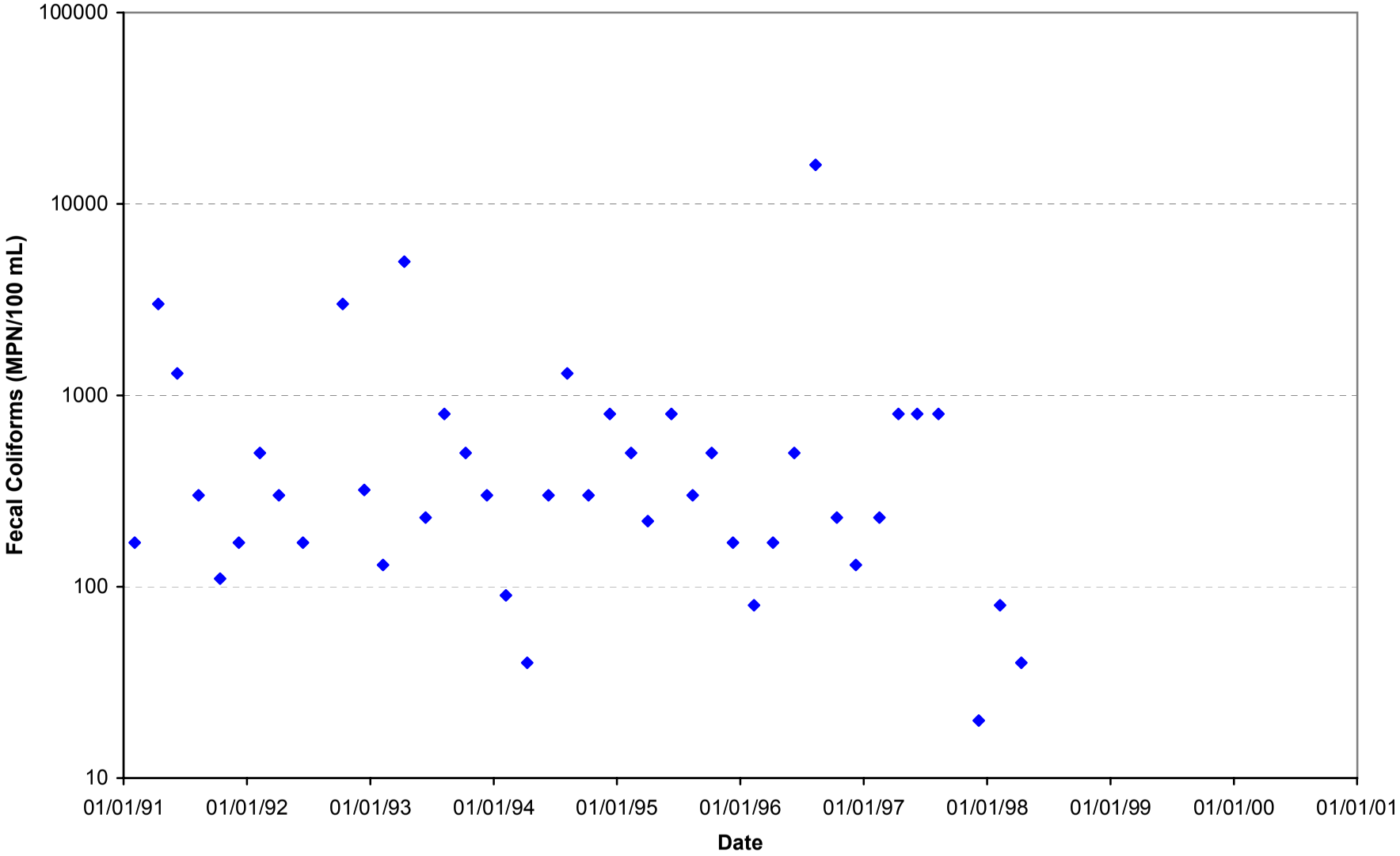


Figure 3.2. Long Term Plot of Fecal Coliform Data for Station 0293

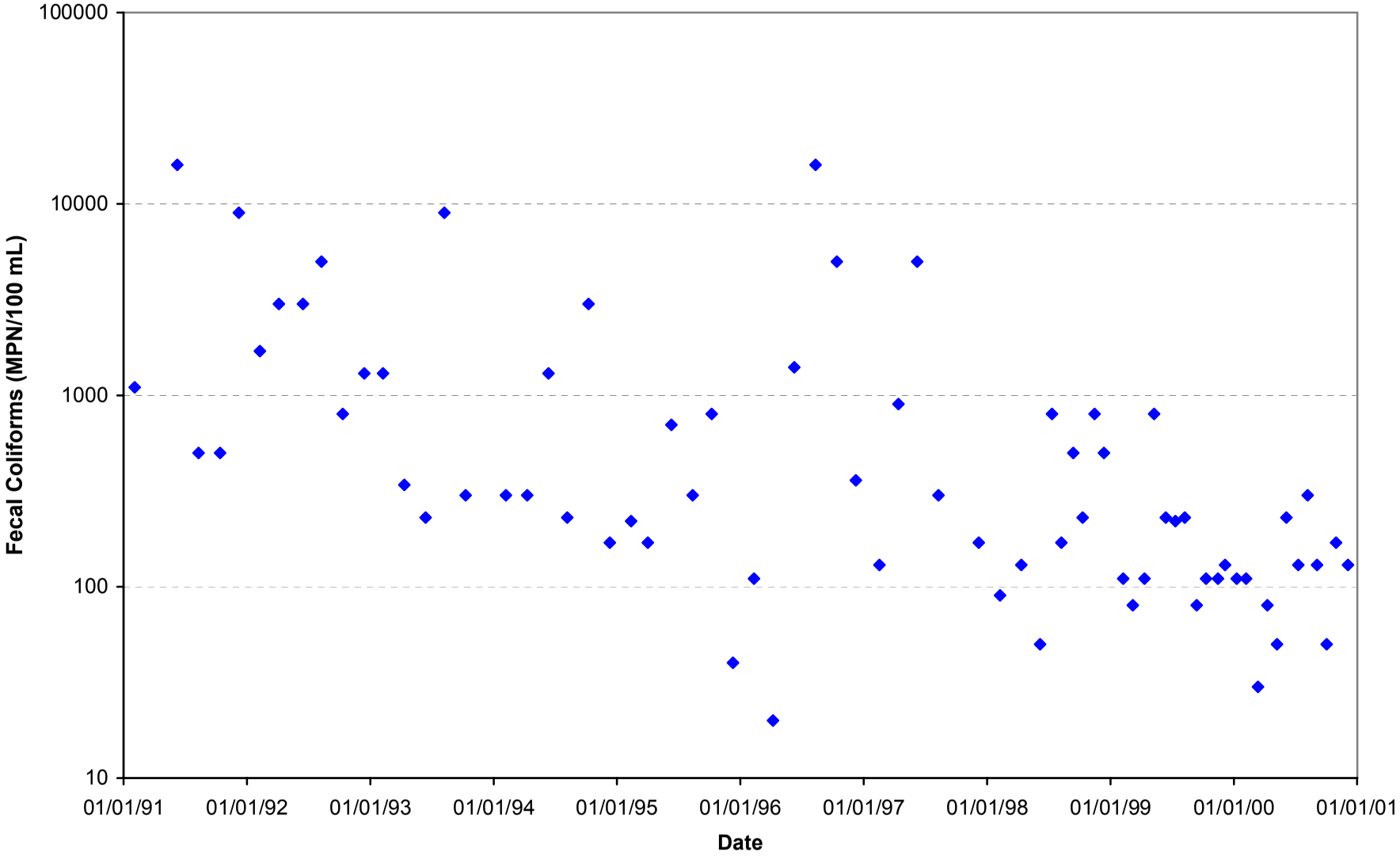


Figure 3.3. Long Term Plot of Fecal Coliform Data for Station 0112

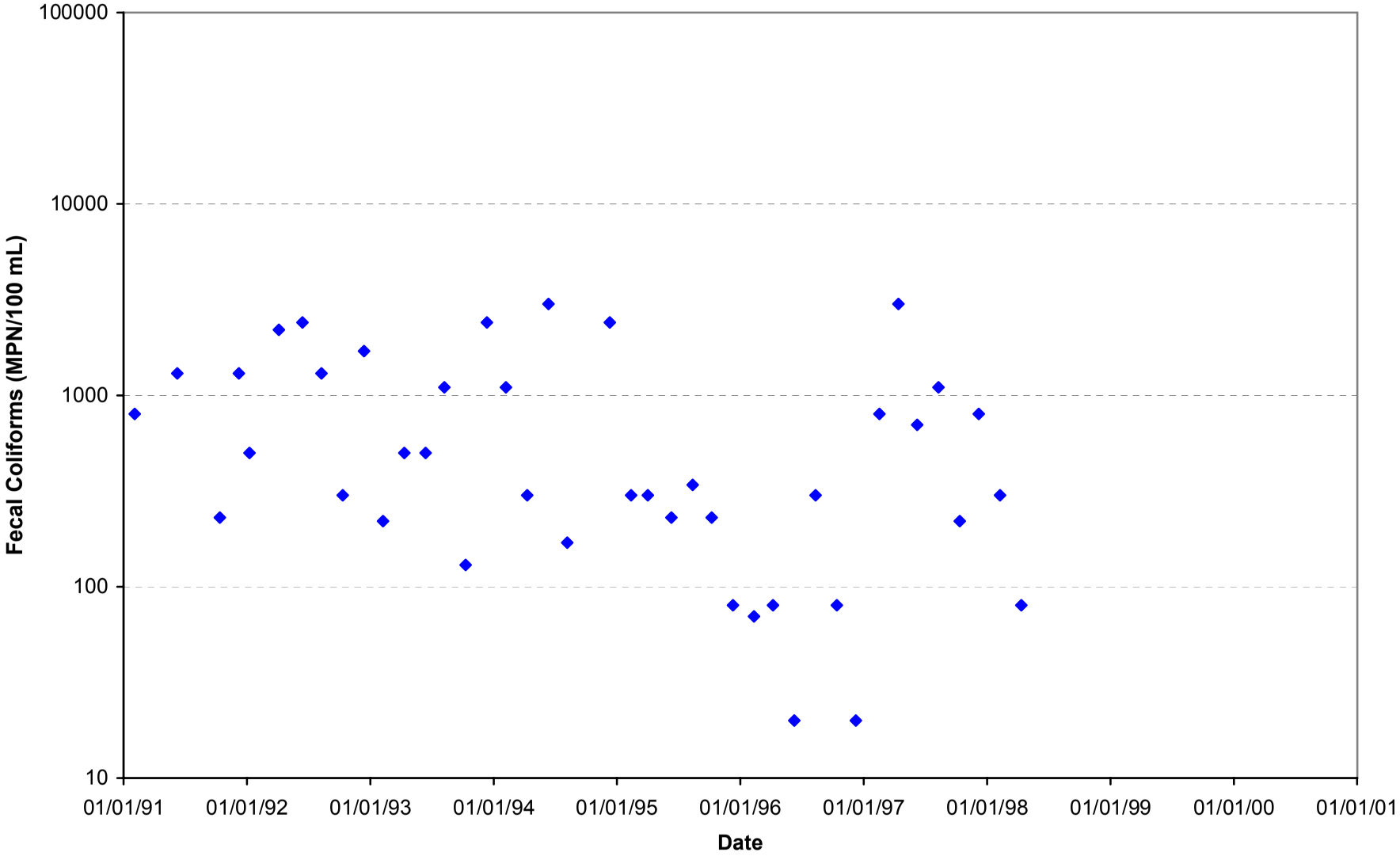


Figure 3.4. Long Term Plot of Fecal Coliform Data for Station 0294

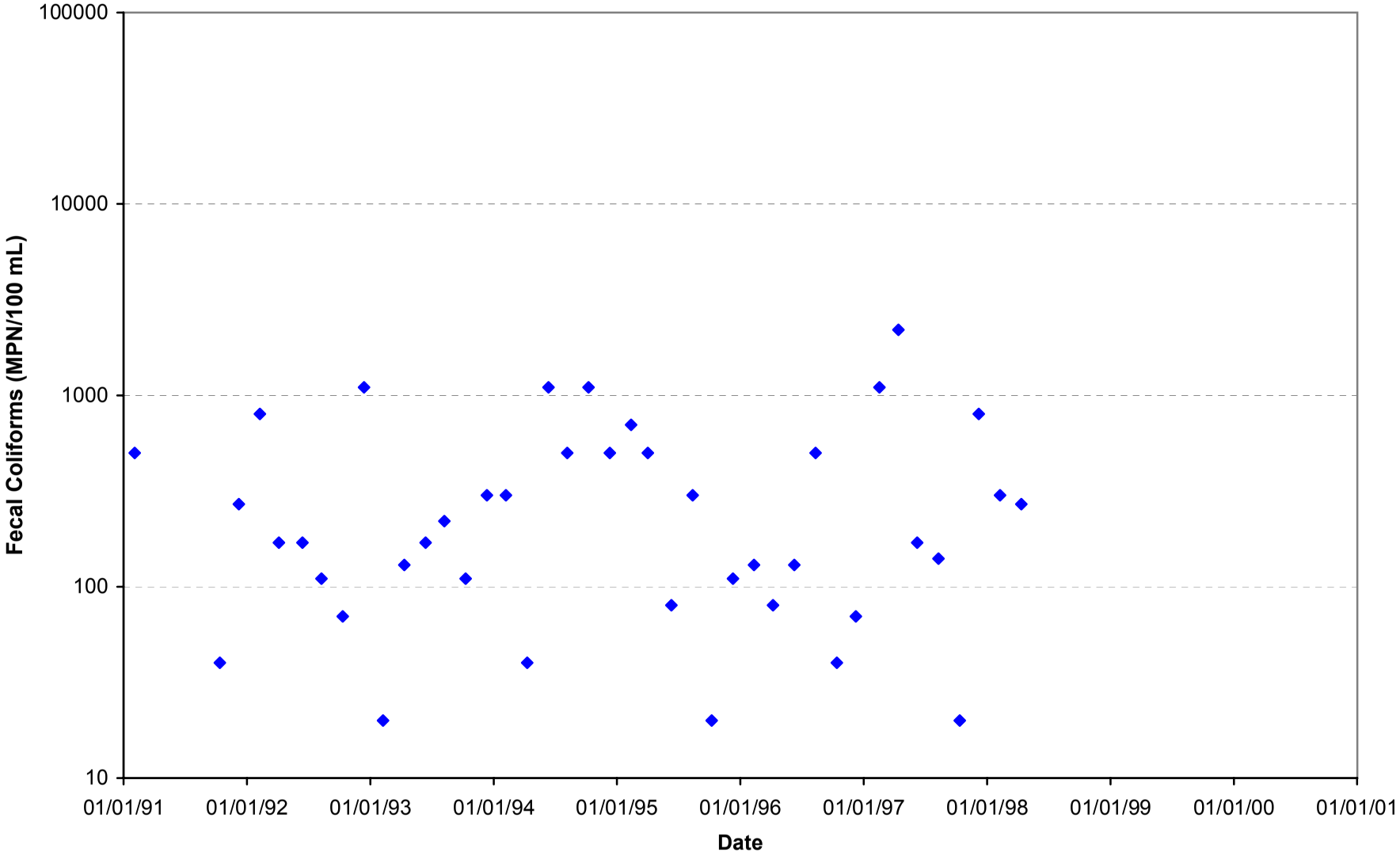


Figure 3.5. Long Term Plot of Fecal Coliform Data for Station 0111

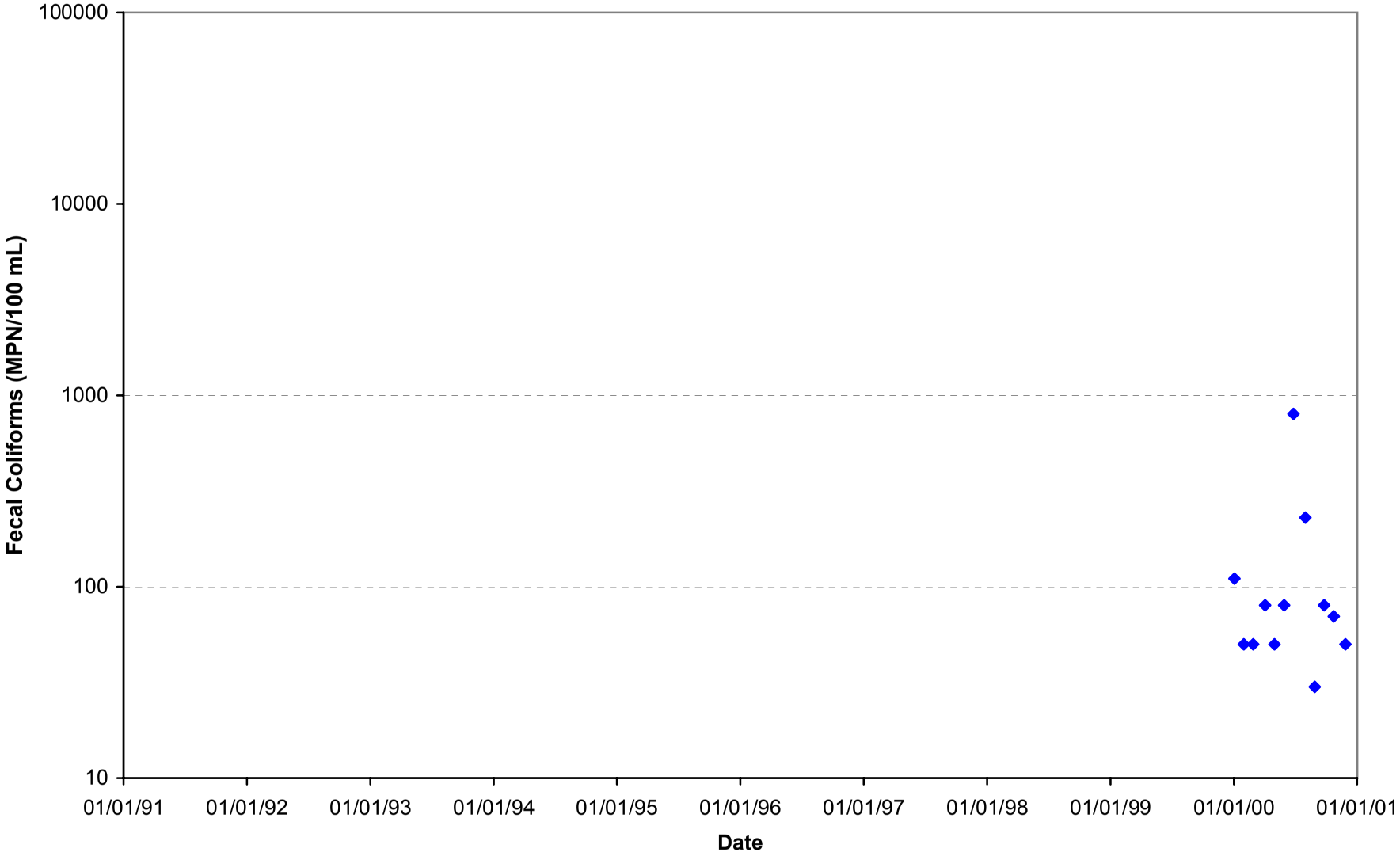


Figure 3.6. Fecal Coliform Counts at Station 0023 vs. 3-day Precipitation

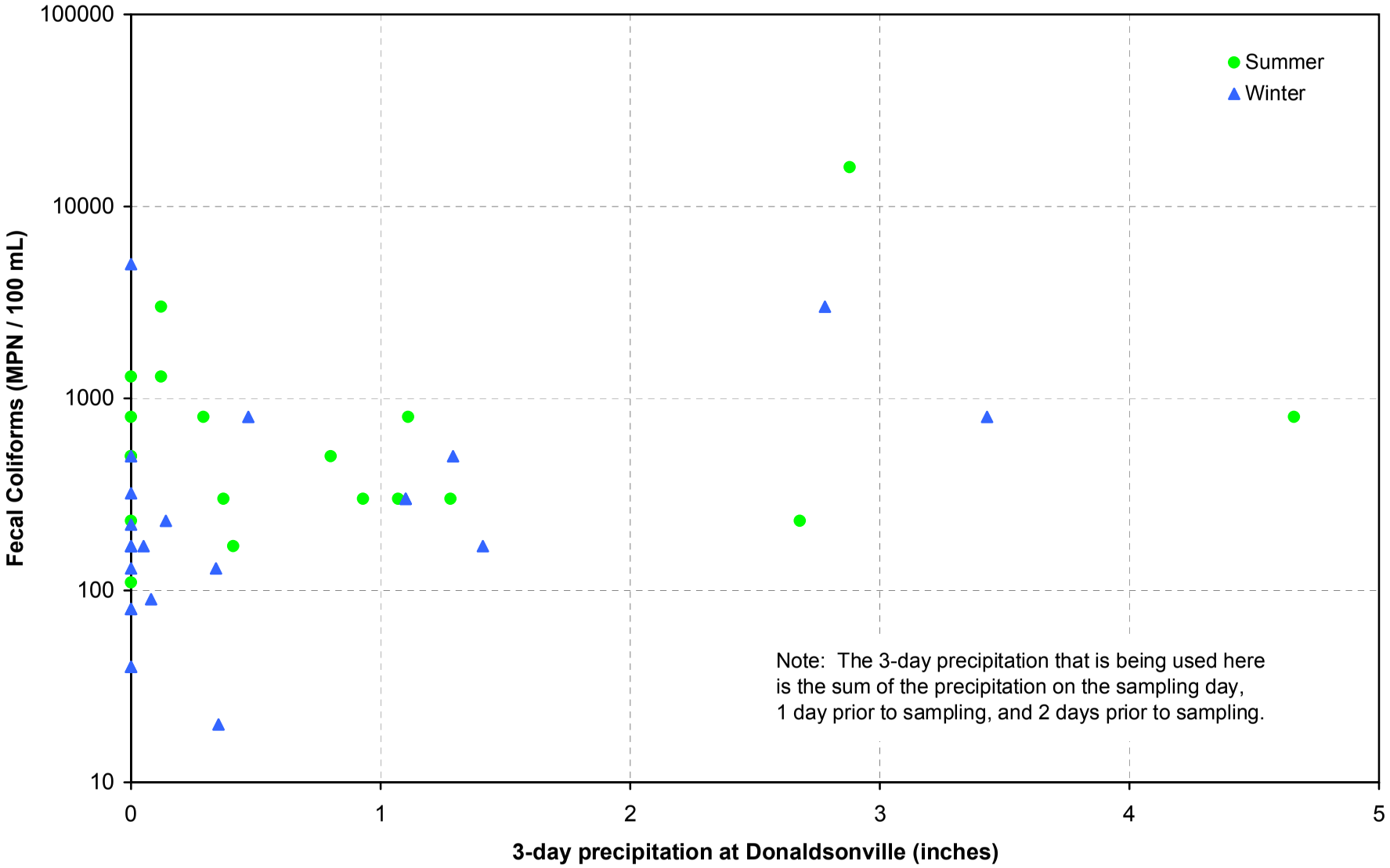


Figure 3.7. Fecal Coliform Counts at Station 0293 vs. 3-day Precipitation

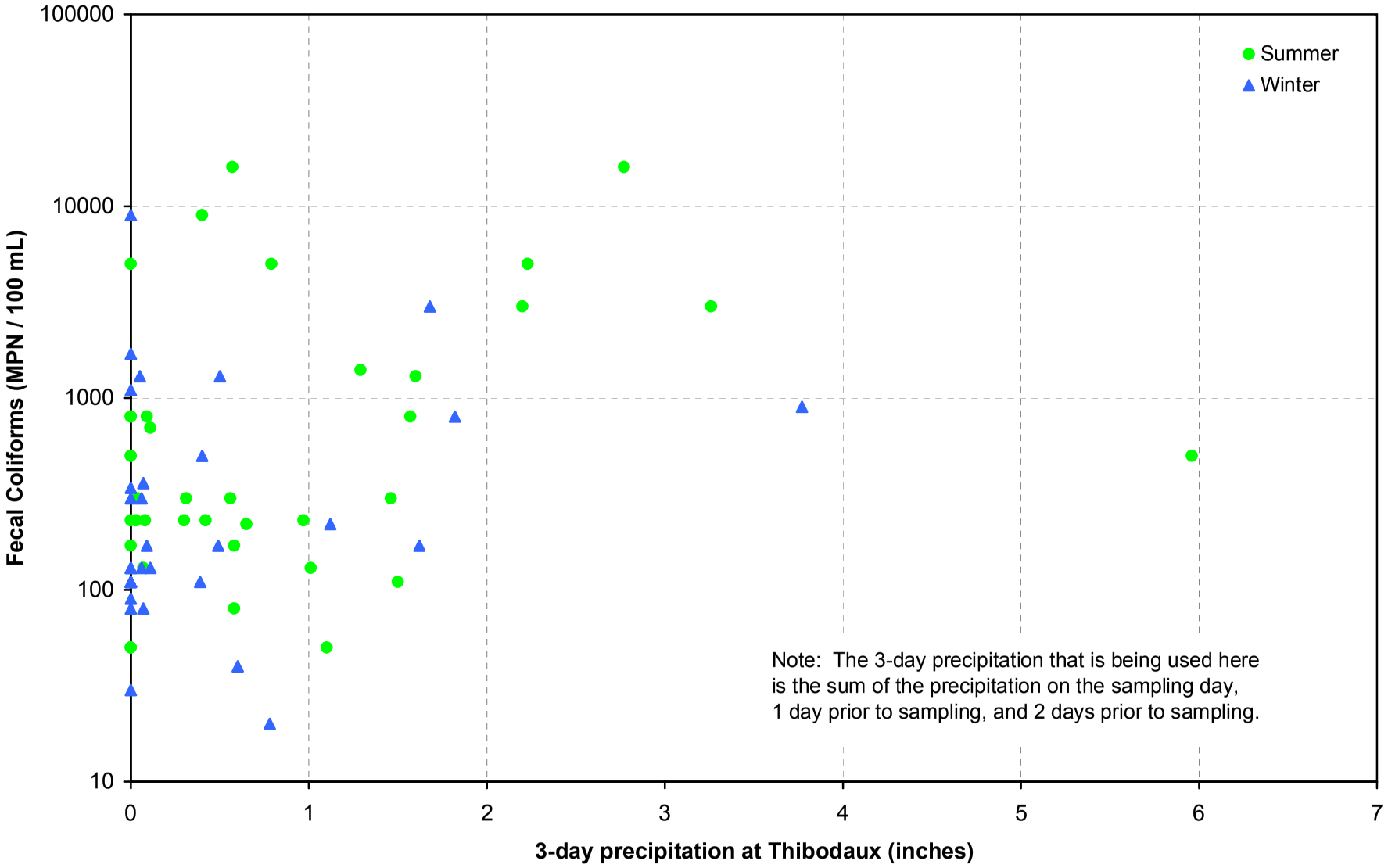


Figure 3.8. Fecal Coliform Counts at Station 0112 vs. 3-day Precipitation

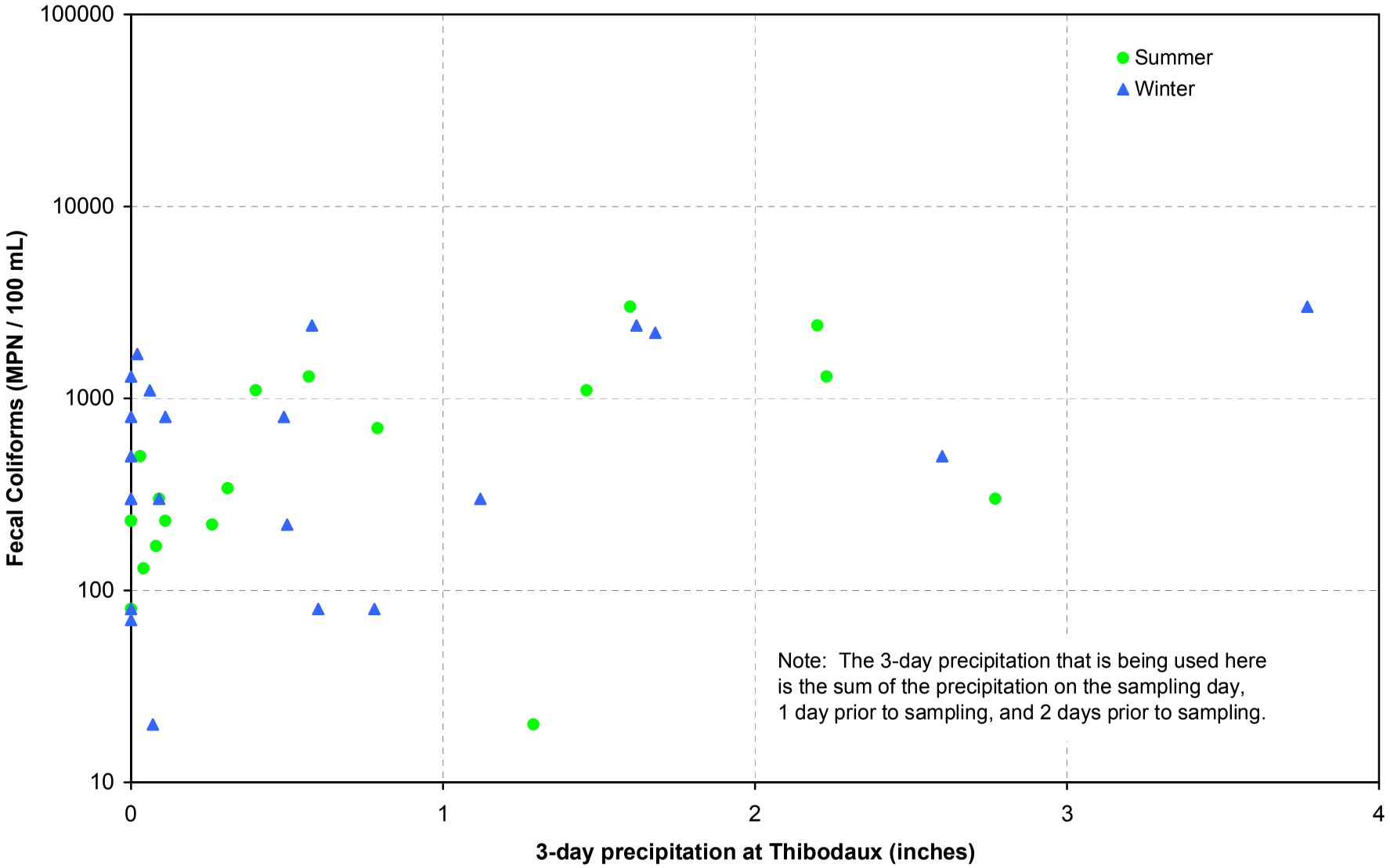


Figure 3.9. Fecal Coliform Counts at Station 0294 vs. 3-day Precipitation

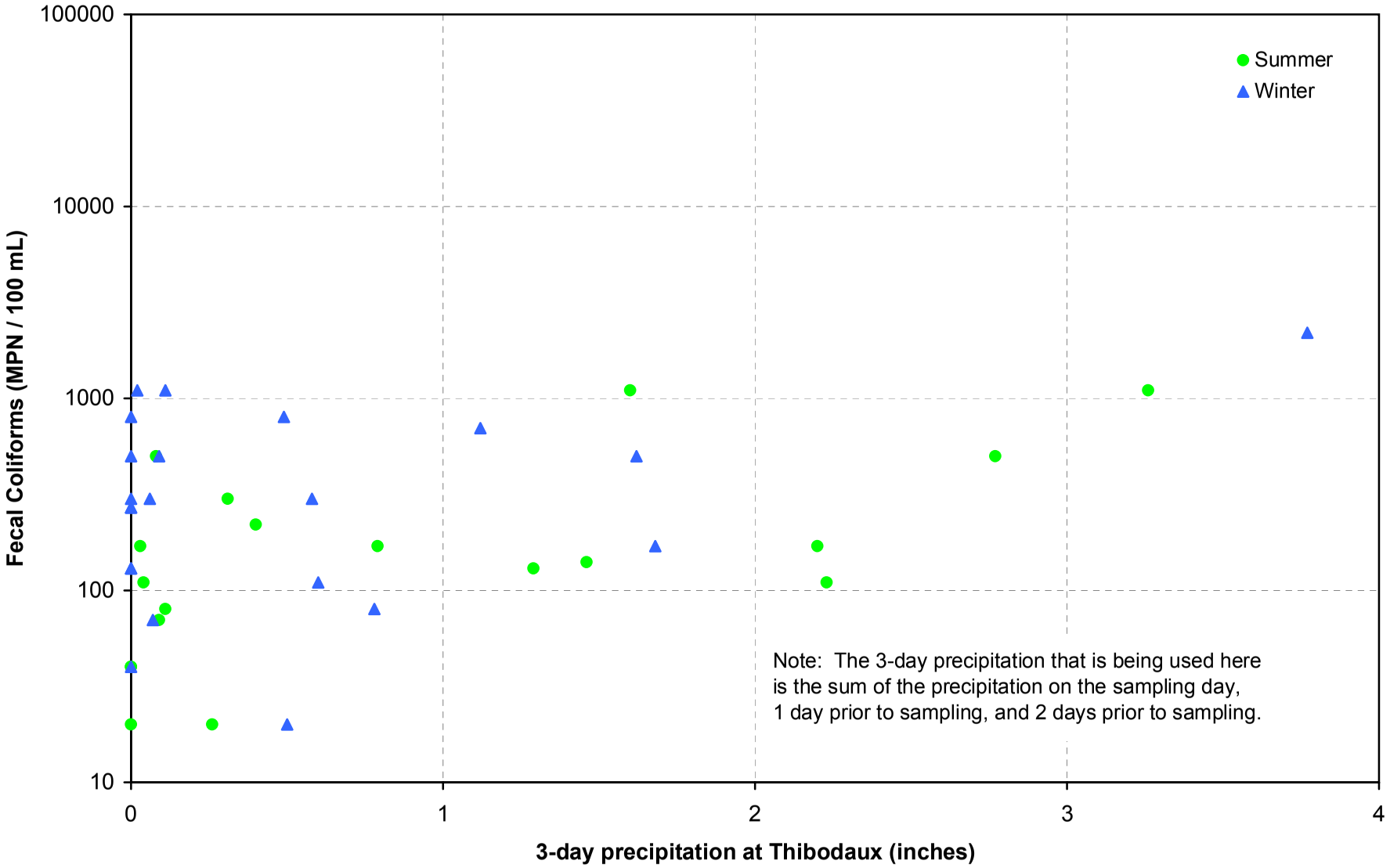


Figure 3.10. Fecal Coliform Counts at Station 0111 vs. 3-day Precipitation

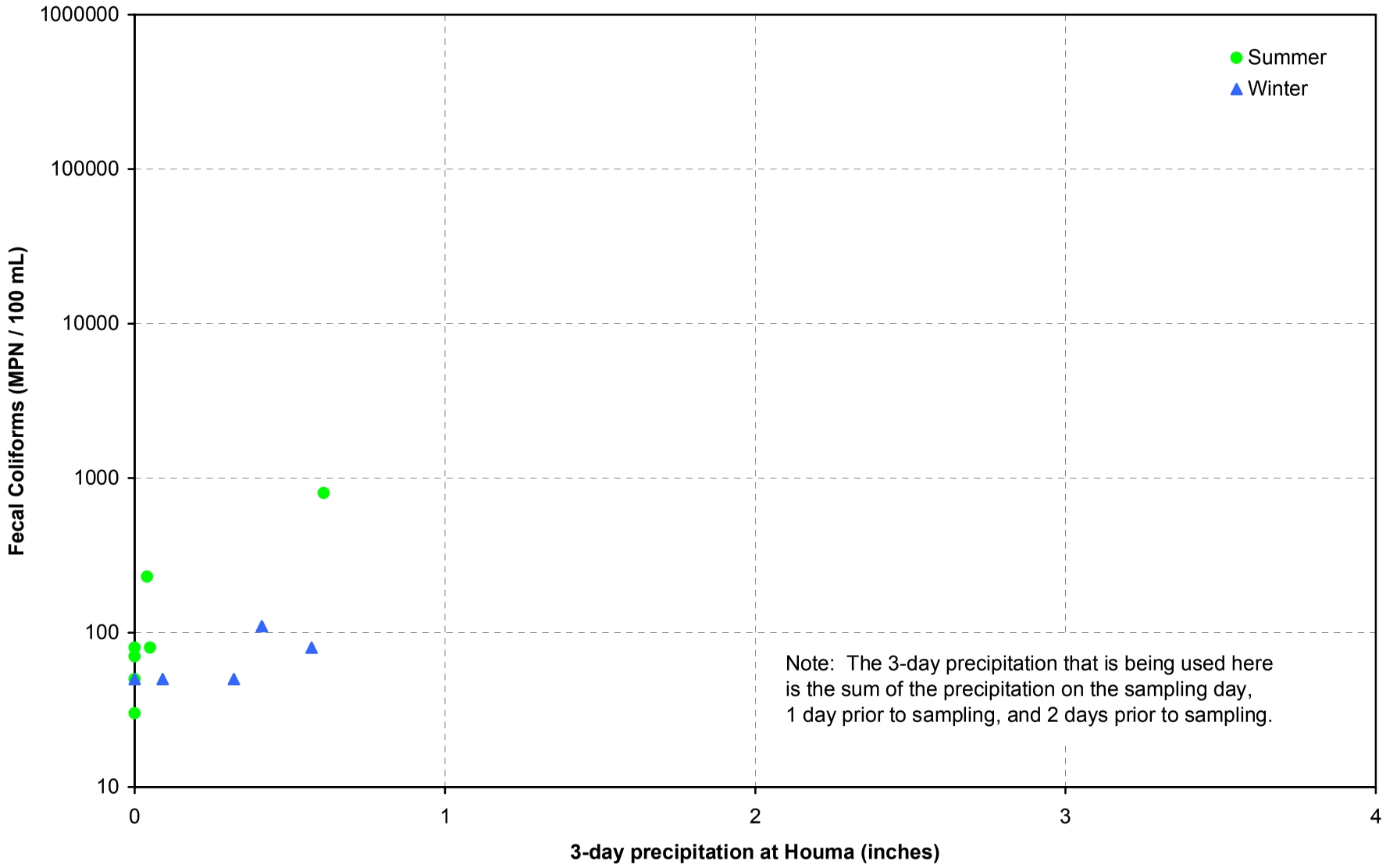


Figure 3.11. Seasonal Plot of Fecal Coliform Data for Station 0023

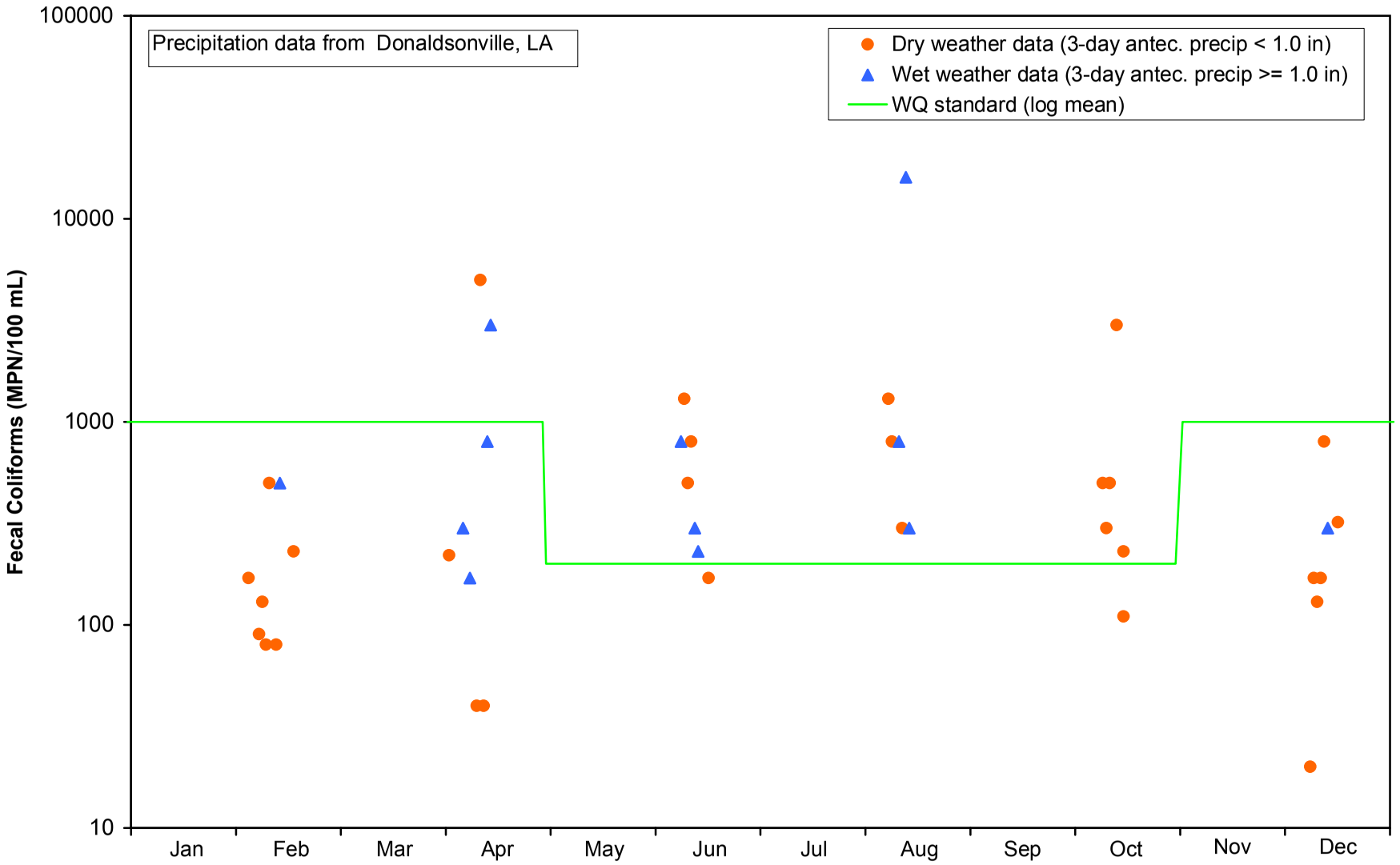


Figure 3.12. Seasonal Plot of Fecal Coliform Data for Station 0293

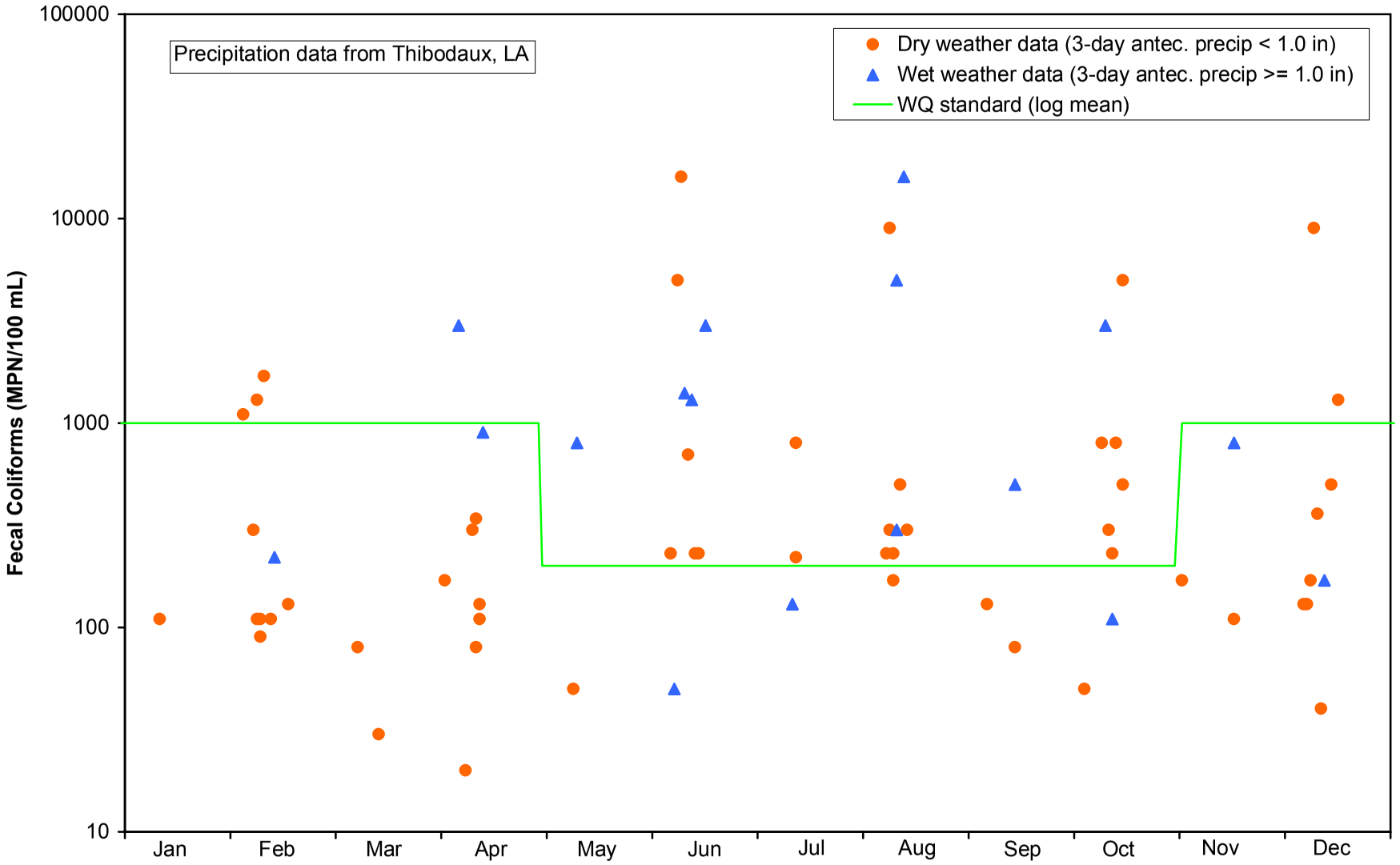


Figure 3.13. Seasonal Plot of Fecal Coliform Data for Station 0112

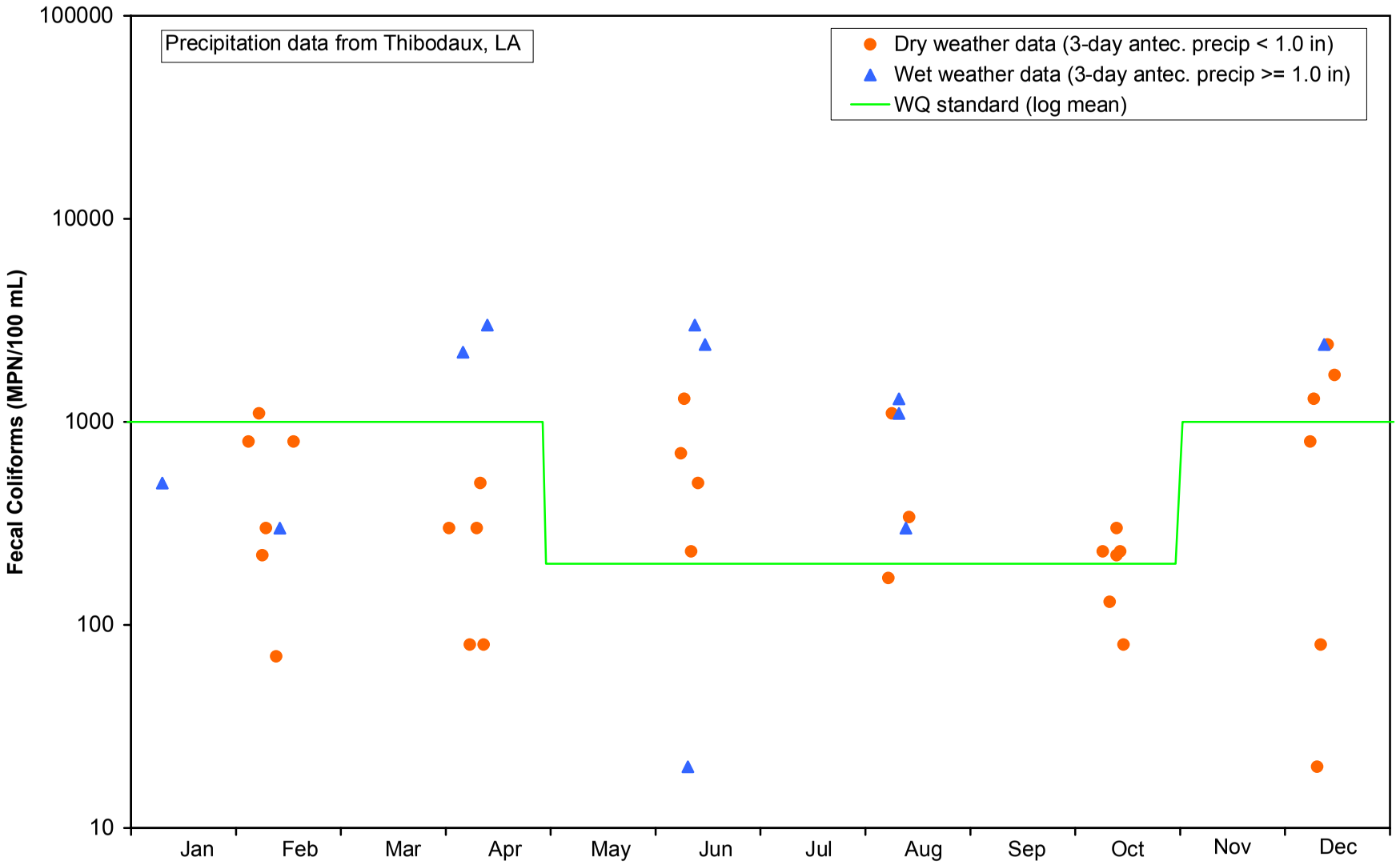


Figure 3.14. Seasonal Plot of Fecal Coliform Data for Station 0294

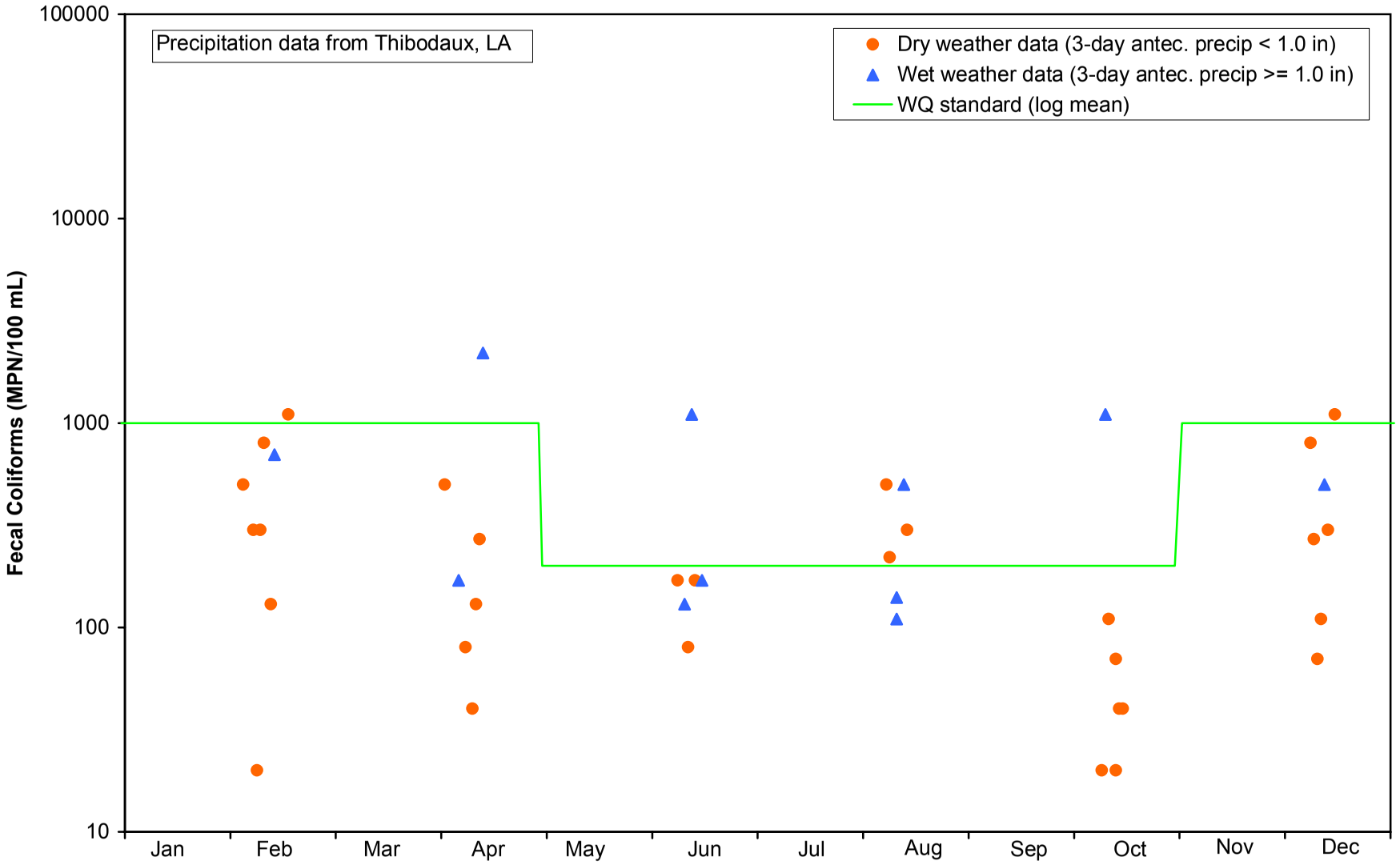
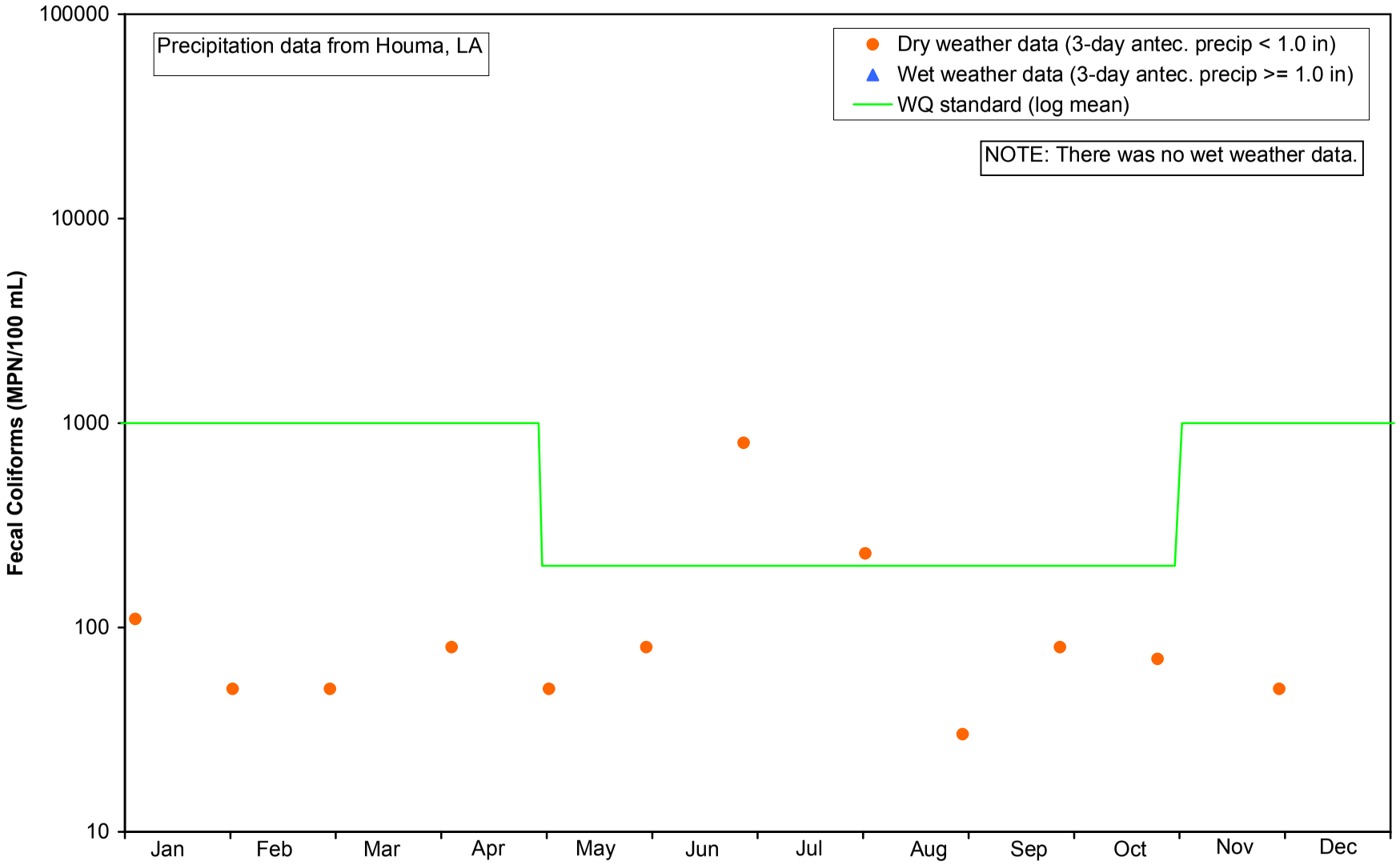


Figure 3.15. Seasonal Plot of Fecal Coliform Data for Station 0111



APPENDIX C

Bacterial Tool Indicator Spreadsheet

Summary worksheet for Bayou Lafourche fecal coliform contributions

Source	Area Load (#/ac/day)	Hourly Load (count/hr)	Summer Daily Load (count/day)	Winter Daily Load (count/day)	Seasonal Loads Summer 184 days	Seasonal Loads Winter 181 days	Percentage for each source Summer	Percentage for each source Winter
Built-up nonpoi	7.30E+07		3.26E+10	3.26E+10	6.00E+12	5.91E+12	5.96%	5.59%
Thibodaux	1.03E+07		4.00E+09	4.00E+09	7.36E+11	7.24E+11	0.73%	0.68%
Lockport	1.34E+07		6.69E+08	6.69E+08	1.23E+11	1.21E+11	0.12%	0.11%
Septics		6.82E+08	1.64E+10	1.64E+10	1.51E+12	1.48E+12	1.50%	1.40%
Pumped water *			4.77E+11	5.14E+11	8.78E+13	9.30E+13	87.18%	87.98%
Wildlife and waterfowl			1.92E+10	1.92E+10	3.54E+12	3.48E+12	3.52%	3.30%
Point sources *			5.45E+09	5.45E+09	1.00E+12	9.87E+11	1.00%	0.93%
Total			5.56E+11	5.92E+11	1.01E+14	1.06E+14	100.00%	100.00%

* Pumped Mississippi River Water

typical flow =	150 cfs =	3.67E+11	mL/day
median summer fecal /100mL =		130	
median winter fecal /100mL =		140	

*Point Sources

total permitted flow =	720500 GPD =	2.73E+09	mL/day
summer fecal /100mL =	200		
winter fecal /100mL =	200		

THIS SPREADSHEET ESTIMATES THE FECAL COLIFORM BACTERIA CONTRIBUTION FROM MULTIPLE SOURCES.

It is based on a modeling study of 10 subwatersheds, composed of four landuses (Cropland, Forest, Built-up, and Pastureland).

BLUE text found throughout the spreadsheet presents valuable information and assumptions.

RED text designates values which should be specified by the user.

BLACK text generally presents information which is calculated by the spreadsheet or that should not be changed.

The 6 subwatersheds for Bayou Lafourche are created by splitting the basin at water quality monitoring stations 0023, 0293, 0112, 0294, and 0111.

The modeled landuses are derived from the original landuses by reassigning the original categories to the corresponding model categories.1% of agricultural land use is assumed to be pasture.

Modeled landuses

Areas are listed in acres.

SUBWATERSHED	BUILT-UP	CROPLAND	PASTURELAND	FOREST	TOTAL
P1	80	4	0	5	88
P2	1940	1341	14	126	3421
P3	682	407	4	13	1106
P4	199	299	3	0	501
P5	166	593	6	23	788
P6	50	0	0	5	55
TOTAL	3116	2644	27	172	5958

The estimated total number of animals in the Bayou Lafourche subwatersheds is shown below.

Fecal contributions from these animals are used to derive loading estimates for all landuses except for Built-up.
Only manure from cattle, swine, and poultry is assumed to be collected and applied to cropland.
Cattle manure is also assumed to be applied to pastureland. Horse manure is assumed to be collected and applied to pastureland only.
Manure from cattle, horses, sheep and "other" is assumed to be contributed to pastureland in proportion to time spent grazing.
Wildlife densities are provided for all land uses except Built-up and are assumed to be the same in all subwatersheds.

Agricultural Animals

SUBWATERSHED	BEEF CATTLE	SWINE (HOGS)	DAIRY CATTLE	CHICKENS	HORSES	SHEEP
P1	0	0	0	0	0	0
P2	7	0	0	0	0	0
P3	2	0	0	0	0	0
P4	2	0	0	0	0	0
P5	3	0	0	0	0	0
P6	0	0	0	0	0	0
TOTAL	13	0	0	0	0	0

Wildlife

	CROPLAND Animals/sq mile	CROPLAND Density/acre	PASTURELAND Density/sq mile	PASTURELAND Density/acre	FOREST Density/sq mile	FOREST Density/acre
Ducks	5	0.0078125	0	0	5	0.0078125
Geese	5	0.0078125	0	0	5	0.0078125
Deer	5	0.0078125	0	0	5	0.0078125
Beaver	5	0.0078125	0	0	5	0.0078125
Raccoons	5	0.0078125	0	0	5	0.0078125
Other	5	0.0078125	0	0	5	0.0078125

This sheet contains information relevant to cattle, horse, sheep and other animals grazing in the study area.

CATTLE

Dairy Cattle

Assume that dairy cattle are only kept in feedlots. Therefore all of their waste is used for manure application (divided between Cropland and Pastureland).

Beef Cattle

Beef cattle are assumed to be either kept in feedlots or allowed to graze (depending on the season). When grazing, a certain proportion is assumed to have direct access to streams.

Beef cattle waste is therefore either applied as manure to Cropland and Pastureland, contributed directly to Pastureland, or contributed directly to streams (referred to as Cattle in Streams).

	Beef Cattle Confined	***Beef Cattle Grazing***	***Beef Cattle In Streams***	***Beef Cattle in Pasture***
Month	**Time Spent Confined (0.00 to 1.00)**	**Time Spent Grazing (0.00 to 1.00)**	**Grazing Time Spent in Streams (0.00 to 1.00)**	**Grazing Time Spent in Pasture (0.00 to 1.00)**
January	1.00	0.00	0.00	0.00
February	1.00	0.00	0.00	0.00
March	1.00	0.00	0.00	0.00
April	0.20	0.80	0.00	0.80
May	0.20	0.80	0.00	0.80
June	0.20	0.80	0.00	0.80
July	0.20	0.80	0.00	0.80
August	0.20	0.80	0.00	0.80
September	0.20	0.80	0.00	0.80
October	0.20	0.80	0.00	0.80
November	0.20	0.80	0.00	0.80
December	1.00	0.00	0.00	0.00

Month	**Total Cattle Grazing Days**
January	0
February	0
March	0
April	24
May	24.8
June	24
July	24.8
August	24.8
September	24
October	24.8
November	24
December	0
Total Grazing Days:	195.2

The data from the following references are accessed in the remaining worksheets.

Animal Fecal Coliform Production Rates

Values from ASAE (1998) are used as default values when available.

	Default Value	*From ASAE, 1998*	*From NCSU, 1994*	*From Metcalf & Eddy, 1991*	*From LIRPB, 1978*	*est Professional Judgemer*	*Mean*	*Min*	*Max*
Animal	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**	**FC (count/animal/day)**
Dairy cow	1.01E+11	1.01E+11	1.04E+11	5.40E+09	3.75E+09	--	5.36E+10	3.75E+09	1.04E+11
Beef cow	1.04E+11	1.04E+11	1.06E+11	5.40E+09	3.75E+09	--	5.49E+10	3.75E+09	1.06E+11
Hog	1.08E+10	1.08E+10	1.24E+10	8.90E+09	8.91E+09	--	1.02E+10	8.90E+09	1.24E+10
Sheep	1.20E+10	1.20E+10	1.22E+10	1.80E+10	--	--	1.41E+10	1.20E+10	1.80E+10
Horse	4.20E+08	4.20E+08	4.18E+08	--	--	--	4.19E+08	4.18E+08	4.20E+08
Chicken	1.36E+08	1.36E+08	1.38E+08	2.40E+08	2.37E+08	--	1.88E+08	1.36E+08	2.40E+08
Turkey	9.30E+07	9.30E+07	8.93E+07	1.30E+08	--	--	1.04E+08	8.93E+07	1.30E+08
Duck	2.43E+09	2.43E+09	2.43E+09	1.10E+10	1.10E+10	--	6.71E+09	2.43E+09	1.10E+10
Goose	4.90E+10	--	--	--	4.90E+10	--	4.90E+10	4.90E+10	4.90E+10
Deer	5.00E+08	--	--	--	--	5.00E+08	5.00E+08	5.00E+08	5.00E+08
Beaver	2.50E+08	--	--	--	--	2.50E+08	2.50E+08	2.50E+08	2.50E+08
Raccoon	1.25E+08	--	--	--	--	1.25E+08	1.25E+08	1.25E+08	1.25E+08
Dog	4.09E+09	--	--	--	4.09E+09	--	4.09E+09	4.09E+09	4.09E+09
Other Ag Animal	0.00E+00	--	--	--	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other Wildlife	0.00E+00	--	--	--	--	0.00E+00	0.00E+00	0.00E+00	0.00E+00

From ASAE, 1998	Total Manure prod	Typical Animal Mass	Manure prod per animal	Fecal Coliform	Fecal Coliform	Manure prod	Fecal Coliform
Animal	**(lb/day per 1,000 lb anima**	**(lb)**	**(lb/day)**	**(count/day E10 per 1,000 lb anim**	**(count/day)**	**(lb/yr)**	**(count/yr)**
Dairy cow	86	1400	120	7.2	1.01E+11	43946	3.68E+13
Beef cow	58	800	46	13	1.04E+11	16936	3.80E+13
Hog	84	135	11	8	1.08E+10	4139	3.94E+12
Sheep	40	60	2	20	1.20E+10	876	4.38E+12
Horse	51	1000	51	0.042	4.20E+08	18615	1.53E+11
Chicken (Layer)	64	4	0	3.4	1.36E+08	93	4.96E+10
Turkey	47	15	1	0.62	9.30E+07	257	3.39E+10
Duck	110	3	0	81	2.43E+09	120	8.87E+11

From LIRPB, 1978	Waste produced	FC content	FC produced
Animal	**(g waste/animal/day)**	**(count/g waste)**	**(count/animal/day)**
Dog	227	1.80E+07	4.09E+09
Duck	336	3.27E+07	1.10E+10
Cattle	16,300	2.30E+05	3.75E+09
Chicken	182	1.30E+06	2.37E+08
Swine	2,700	3.30E+06	8.91E+09

Built-Up Fecal Coliform Accumulation Rates

	From: Horner, 1992	
Land Use	**median count/ha/yr**	**median count/acre/day**
Road	1.80E+08	2.00E+05
Commercial	5.60E+09	6.21E+06
Single family low density	9.30E+09	1.03E+07
Single family high density	1.50E+10	1.66E+07
Multifamily residential	2.10E+10	2.33E+07

This sheet calculates the total fecal coliform bacteria produced by wildlife each day per acre of cropland, pastureland and forest.

Wildlife

	CROPLAND animals/acre	CROPLAND FC/acre/day	PASTURELAND animals/acre	PASTURELAND FC/acre/day	FOREST animals/acre	FOREST FC/acre/day
Ducks	0.008	1.90E+07	0.000	0.00E+00	0.008	1.90E+07
Geese	0.008	3.83E+08	0.000	0.00E+00	0.008	3.83E+08
Deer	0.008	3.91E+06	0.000	0.00E+00	0.008	3.91E+06
Beaver	0.008	1.95E+06	0.000	0.00E+00	0.008	1.95E+06
Raccoons	0.008	9.77E+05	0.000	0.00E+00	0.008	9.77E+05
Other	0.008	0.00E+00	0.000	0.00E+00	0.008	0.00E+00
Total	0.031	6.84E+06	0.00	0.00E+00	0.031	6.84E+06

Due to lack of animal counts, etc. for Built-up land, literature values are used.
The breakout of Built-up land into Commercial and Services, Mixed Urban or Built-Up, Residential, and Transportation, Communications and Utilities is specified by the user below.
A single, weighted Built-up loading value is quantified for each subwatershed based on individual built-up landuses present and their corresponding loading rates.
Loading rates are calculated for each Built-up land use category using the values found in Horner (1992) as follows:
- Commercial and Services: Commercial
- Mxd Urban or Built-up: Average FC accumulation rates for Road, Commercial, Single family low density, Single family high density, and Multifamily residential
- Residential: Average FC accumulation rates for Single family low density, Single family high density, and Multifamily residential
- Trans, Comm, Util: Road

URBAN LAND

Built-Up land use breakout by subwatershed (fraction of built-up land that is used for commercial and services, mixed urban, residentital, and transportation, communication and utilities)

	COMMERCIAL AND SERVICES	MXD URBAN OR BUILT-UP	RESIDENTIAL	TRANS, COMM, UTIL	TOTAL
P1	0.25	0.25	0.25	0.25	1
P2	0.1	0.1	0.6	0.2	1
P3	0.1	0.1	0.6	0.2	1
P4	0	0	0.8	0.2	1
P5	0	0	0.8	0.2	1
P6	0	0	0.8	0.2	1
P7	0	0	0.8	0.2	1
P8	0	0	0	0	0
P9	0	0	0	0	0
P10	0	0	0	0	0

	COMMERCIAL AND SERVICES		MXD URBAN OR BUILT-UP		RESIDENTIAL		TRANS, COMM, UTIL		TOTAL	
All Months	Area (acres)	FC accum (count/acre/day)	Area (acres)	FC accum (count/acre/day)	Area (acres)	FC accum (count/acre/day)	Area (acres)	FC accum (count/acre/day)	FC accum (count/acre/day)	(count/day)
P1	20	6.21E+06	20	1.13E+07	20	1.67E+07	20	2.00E+05	8.62E+06	6.88E+08
P2 nonpoint	78	6.21E+06	78	1.13E+07	1048	1.67E+07	349	2.00E+05	1.22E+07	1.90E+10
P2 Thibodaux	116	6.21E+06	116	1.13E+07	116	1.67E+07	39	2.00E+05	1.03E+07	4.00E+09
P3	68	6.21E+06	68	1.13E+07	409	1.67E+07	136	2.00E+05	1.18E+07	8.07E+09
P4 nonpoint	0	0.00E+00	0	0.00E+00	119	1.67E+07	30	2.00E+05	1.34E+07	2.01E+09
P4 Lockport	0	0.00E+00	0	0.00E+00	40	1.67E+07	10	2.00E+05	1.34E+07	6.69E+08
P5	0	0.00E+00	0	0.00E+00	132	1.67E+07	33	2.00E+05	1.34E+07	2.22E+09
P6	0	0.00E+00	0	0.00E+00	40	1.67E+07	10	2.00E+05	1.34E+07	6.71E+08
P7	0	0.00E+00	0	0.00E+00	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0.00E+00	0	0.00E+00	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0.00E+00	0	0.00E+00	0	0.00E+00	0	0.00E+00	0.00E+00	0.00E+00

Sources of fecal coliform bacteria for the Pastureland are wildlife, cattle and horse manure application, and beef cattle, horse, sheep and other grazing.

Note that not all cattle waste is applied to Pastureland.

Assume that dairy cattle are only kept in feedlots. Therefore all of their waste is used for manure application (divided between Cropland and Pastureland).

Beef cattle are assumed to be either kept in feedlots or allowed to graze (depending on the season). When grazing, a certain proportion is assumed to have direct access to streams.

Beef cattle waste is therefore either applied as manure to Cropland and Pastureland, contributed directly to Pastureland, or contributed directly to streams (referred to as Cattle in Streams).

* The FC produced (as listed in the Cattle Manure Application section) does not consider the amount produced by grazing cattle or cattle in the streams.

Beef cattle are assumed to graze only from April through November. During this period a specified percentage of grazing cattle also have direct access to streams.

* Note that the Beef Cattle Grazing section takes into account the number of cattle with access to rivers. See the Cattle in Streams worksheet.

PASTURELAND

		Beef Cattle Grazing*					Horse Grazing				
January	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
	27										

		Beef Cattle Grazing					Horse Grazing				
February	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
March	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
April	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
May	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
June	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
July	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
August	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
September	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
October	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
November	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	5	0.80	4.51E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00

P3	4	2	2	0.80	1.37E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	1	0.80	1.01E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	2	0.80	1.99E+11	3.33E+10	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.80	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

		Beef Cattle Grazing					Horse Grazing				
December	Area (acres)	# beef cattle	# grazing	time in pasture	FC prod (count/day)	FC accum (count/acre/day)	# horses	# grazing	FC pasture (count/day)	FC stable (count/day)	FC accum (count/acre/day)
P1	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P2	14	7	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P3	4	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P4	3	2	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P5	6	3	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P6	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P7	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P8	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P9	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00
P10	0	0	0	0.00	0.00E+00	0.00E+00	0	0	0.00E+00	0.00E+00	0.00E+00

This sheet contains information related to the contribution of failing septic systems to streams.

The direct contribution of fecal coliform from septics to a stream can be represented as a point source in the model. Required input for point sources in NPSM are loading rate (#/hr) and flow (cfs).

The following assumptions are made for septic contributions.

Estimated # septics:	618		
Estimated # people served by septics:	1545		
Avg # people served per septic:	2.5	people/septic	
Assume a failure rate for septics in the watershed:	40	%	
Therefore the number of failing septics in the watershed is:	247		
Assume failing septics are distributed evenly across watershed based on land area. Therefore, density of failing septics is	0.041489	failing septic systems/acre	
Assume the average FC concentration reaching the stream (from septic overcharge) is:	1.00E+04	count/100 ml	**(Horsely & Whitten, 1996)**
Assume a typical septic overcharge flow rate of:	70	gal/day/person	**(Horsely & Whitten, 1996)**

SEPTICS AS A POINT SOURCE

Subwatershed	Total area (acres)	# failing septics	Tot. # people served	Septic flow (gal/day)	Septic flow (mL/hr)	FC rate (count/hr)	Septic flow (cfs)
P1	88	3.6	9.1	639	100,736	1.01E+07	9.90E-04
P2	3,421	141.9	354.8	24836	3,916,842	3.92E+08	3.85E-02
P3	1,106	45.9	114.7	8028	1,266,024	1.27E+08	1.24E-02
P4	501	20.8	52.0	3640	574,013	5.74E+07	5.64E-03
P5	788	32.7	81.7	5718	901,726	9.02E+07	8.86E-03
P6	55	2.3	5.7	400	63,121	6.31E+06	6.20E-04
P7	0	0.0	0.0	0	0	0.00E+00	0.00E+00
P8	0	0.0	0.0	0	0	0.00E+00	0.00E+00
P9	0	0.0	0.0	0	0	0.00E+00	0.00E+00
P10	0	0.0	0.0	0	0	0.00E+00	0.00E+00
Total:	5,958						

APPENDIX D

Percent Reduction Calculations

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0023
Bayou Lafourche near Donaldsonville, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
6/10/91	1020	summer	1300	77%	299
8/12/91	1030	summer	300	77%	69
10/15/91	1020	summer	110	--	110
6/16/92	1000	summer	170	--	170
10/12/92	1015	summer	3000	77%	690
6/14/93	0945	summer	230	77%	53
8/9/93	0945	summer	800	77%	184
10/11/93	1020	summer	500	77%	115
6/13/94	1005	summer	300	77%	69
8/8/94	0950	summer	1300	77%	299
10/10/94	0945	summer	300	77%	69
6/12/95	1030	summer	800	77%	184
8/14/95	1100	summer	300	77%	69
10/9/95	1145	summer	500	77%	115
6/10/96	0920	summer	500	77%	115
8/12/96	0930	summer	16000	77%	3680
10/14/96	0950	summer	230	77%	53
6/9/97	1000	summer	800	77%	184
8/11/97	1000	summer	800	77%	184

Existing summer log mean = 581
Summer WQ standard for log mean (primary contact recr.) = 200
Explicit margin of safety (20%) = 40
Target value for summer log mean = 160
Summer log mean after reductions = 156

Existing summer 75th percentile = 800
Summer WQ standard for 75th %tile (primary contact recr.) = 400
Explicit margin of safety (20%) = 80
Target value for summer 75th percentile = 320
Summer 75th percentile after reductions = 184

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0023.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0023
Bayou Lafourche near Donaldsonville, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
2/4/91	35	winter	170	--	170
4/15/91	105	winter	3000	0%	3000
12/9/91	343	winter	170	--	170
2/10/92	41	winter	500	--	500
4/6/92	97	winter	300	--	300
12/15/92	350	winter	320	--	320
2/8/93	39	winter	130	--	130
4/12/93	102	winter	5000	0%	5000
12/13/93	347	winter	300	--	300
2/7/94	38	winter	90	--	90
4/11/94	101	winter	40	--	40
12/12/94	346	winter	800	--	800
2/13/95	44	winter	500	--	500
4/3/95	93	winter	220	--	220
12/11/95	345	winter	170	--	170
2/12/96	43	winter	80	--	80
4/8/96	99	winter	170	--	170
12/9/96	344	winter	130	--	130
2/17/97	48	winter	230	--	230
4/14/97	104	winter	800	--	800
12/8/97	342	winter	< 20	--	20
2/9/98	40	winter	80	--	80
4/13/98	103	winter	40	--	40

Existing winter log mean = 222
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 222

Existing winter 75th percentile = 410
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 410

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0023.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou LaFourche at Station 0293
Bayou Lafourche at Thibodaux, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/31/00	0935	summer	170	--	170
10/3/00	1020	summer	50	--	50
9/5/00	1000	summer	130	--	130
8/8/00	1015	summer	300	75%	75
7/11/00	0920	summer	130	--	130
6/6/00	0955	summer	230	75%	58
5/9/00	0955	summer	50	--	50
10/12/99	0940	summer	110	--	110
9/14/99	1000	summer	80	--	80
8/10/99	1000	summer	230	75%	58
7/13/99	1100	summer	220	75%	55
6/15/99	0935	summer	230	75%	58
5/11/99	1112	summer	800	75%	200
10/12/98	1023	summer	230	75%	58
9/14/98	1015	summer	500	75%	125
8/10/98	1010	summer	170	--	170
7/13/98	1015	summer	800	75%	200
6/8/98	1040	summer	50	--	50
8/11/97	1110	summer	300	75%	75
6/9/97	1100	summer	5000	75%	1250
10/14/96	1100	summer	5000	75%	1250
8/12/96	1040	summer	16000	75%	4000
6/10/96	1035	summer	1400	75%	350
10/9/95	1045	summer	800	75%	200
8/14/95	1215	summer	300	75%	75
6/12/95	1130	summer	700	75%	175
10/10/94	1045	summer	3000	75%	750
8/8/94	1100	summer	230	75%	58
6/13/94	0900	summer	1300	75%	325
10/11/93	0900	summer	300	75%	75
8/9/93	0840	summer	9000	75%	2250
6/14/93	0840	summer	230	75%	58
10/12/92	0905	summer	800	75%	200
8/10/92	0910	summer	5000	75%	1250
6/16/92	0900	summer	3000	75%	750
10/15/91	0930	summer	500	75%	125
8/12/91	0940	summer	500	75%	125
6/10/91	0930	summer	16000	75%	4000

Existing summer log mean = 525
Summer WQ standard for log mean (primary contact recr.) = 200

Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		157
Existing summer 75th percentile =	800	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		200

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0293.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou LaFourche at Station 0293
Bayou Lafourche at Thibodaux, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
12/5/00	340	winter	130	--	130
4/11/00	102	winter	80	--	80
3/14/00	74	winter	30	--	30
2/8/00	39	winter	110	--	110
1/11/00	11	winter	110	--	110
12/7/99	341	winter	130	--	130
11/16/99	320	winter	110	--	110
4/13/99	103	winter	110	--	110
3/9/99	68	winter	80	--	80
2/9/99	40	winter	110	--	110
12/14/98	348	winter	500	--	500
11/16/98	320	winter	800	--	800
4/13/98	103	winter	130	--	130
2/9/98	40	winter	90	--	90
12/8/97	342	winter	170	--	170
4/14/97	104	winter	900	--	900
2/17/97	48	winter	130	--	130
12/9/96	344	winter	360	--	360
4/8/96	99	winter	20	--	20
2/12/96	43	winter	110	--	110
12/11/95	345	winter	40	--	40
4/3/95	93	winter	170	--	170
2/13/95	44	winter	220	--	220
12/12/94	346	winter	170	--	170
4/11/94	101	winter	300	--	300
2/7/94	38	winter	300	--	300
4/12/93	102	winter	340	--	340
2/8/93	39	winter	1300	0%	1300
12/15/92	350	winter	1300	0%	1300
4/6/92	97	winter	3000	0%	3000
2/10/92	41	winter	1700	0%	1700
12/9/91	343	winter	9000	0%	9000
2/4/91	35	winter	1100	0%	1100

Existing winter log mean = 238
Winter WQ standard for log mean (secondary contact recr.) = 1000

Explicit margin of safety (20%) =		200
Target value for winter log mean =		800
Winter log mean after reductions =		238
Existing winter 75th percentile =	500	
Winter WQ standard for 75th %tile (secondary contact recr.) =		2000
Explicit margin of safety (20%) =		400
Target value for winter 75th percentile =		1600
Winter 75th percentile after reductions =		500

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0293.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0112
Bayou Lafourche at Raceland, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/13/97	0900	summer	220	71%	64
8/11/97	0935	summer	1100	71%	319
6/9/97	0925	summer	700	71%	203
10/14/96	0930	summer	80	--	80
8/12/96	0849	summer	300	71%	87
6/10/96	0930	summer	20	--	20
10/9/95	0915	summer	230	71%	67
8/14/95	0930	summer	340	71%	99
6/12/95	0835	summer	230	71%	67
8/8/94	0925	summer	170	--	170
6/13/94	0900	summer	3000	71%	870
10/11/93	0840	summer	130	--	130
8/9/93	0830	summer	1100	71%	319
6/14/93	0850	summer	500	71%	145
10/12/92	0855	summer	300	71%	87
8/10/92	0850	summer	1300	71%	377
6/15/92	0845	summer	2400	71%	696
10/14/91	0845	summer	230	71%	67
6/10/91	1030	summer	1300	71%	377

Existing summer log mean = 387
Summer WQ standard for log mean (primary contact recr.) = 200
Explicit margin of safety (20%) = 40
Target value for summer log mean = 160
Summer log mean after reductions = 146

Existing summer 75th percentile = 1100
Summer WQ standard for 75th %tile (primary contact recr.) = 400
Explicit margin of safety (20%) = 80
Target value for summer 75th percentile = 320
Summer 75th percentile after reductions = 319

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0112.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0112
Bayou Lafourche at Raceland, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
4/13/98	0900	winter	80	--	80
2/9/98	0830	winter	300	--	300
12/8/97	0830	winter	800	--	800
4/14/97	0925	winter	3000	0%	3000
2/17/97	0945	winter	800	--	800
12/9/96	0930	winter	20	--	20
4/8/96	0930	winter	80	--	80
2/12/96	0930	winter	70	--	70
12/11/95	0935	winter	80	--	80
4/3/95	0915	winter	300	--	300
2/13/95	0930	winter	300	--	300
12/12/94	0845	winter	2400	0%	2400
4/11/94	0845	winter	300	--	300
2/7/94	0840	winter	1100	0%	1100
12/13/93	0830	winter	2400	0%	2400
4/12/93	0835	winter	500	--	500
2/8/93	0940	winter	220	--	220
12/14/92	0835	winter	1700	0%	1700
4/6/92	0845	winter	2200	0%	2200
1/10/92	0825	winter	500	--	500
12/9/91	0850	winter	1300	0%	1300
2/4/91	1040	winter	800	--	800

Existing winter log mean = 441
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 441

Existing winter 75th percentile = 1250
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 1250

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0112.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou LaFourche at Station 0294
Bayou Lafourche at Lockport, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season		Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/13/97	0830	summer	<	20	--	20
8/11/97	0915	summer		140	--	140
6/9/97	0900	summer		170	--	170
10/14/96	0900	summer		40	--	40
8/12/96	1139	summer		500	0%	500
6/10/96	0900	summer		130	--	130
10/9/95	0900	summer	<	20	--	20
8/14/95	0900	summer		300	0%	300
6/12/95	0815	summer		80	--	80
10/10/94	0900	summer		1100	0%	1100
8/8/94	0900	summer		500	0%	500
6/13/94	0830	summer		1100	0%	1100
10/11/93	1100	summer		110	--	110
8/9/93	0815	summer		220	0%	220
6/14/93	0815	summer		170	--	170
10/12/92	0810	summer		70	--	70
8/10/92	0810	summer		110	--	110
6/15/92	0815	summer		170	--	170
10/14/91	0810	summer		40	--	40
6/10/91	0000	summer			--	

Existing summer log mean =	142	
Summer WQ standard for log mean (primary contact recr.) =		200
Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		142
Existing summer 75th percentile =	260	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		260

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0294.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou LaFourche at Station 0294
Bayou Lafourche at Lockport, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
4/13/98	103	winter	270	--	270
2/9/98	40	winter	300	--	300
12/8/97	342	winter	800	--	800
4/14/97	104	winter	2200	0%	2200
2/17/97	48	winter	1100	0%	1100
12/9/96	344	winter	70	--	70
4/8/96	99	winter	80	--	80
2/12/96	43	winter	130	--	130
12/11/95	345	winter	110	--	110
4/3/95	93	winter	500	--	500
2/13/95	44	winter	700	--	700
12/12/94	346	winter	500	--	500
4/11/94	101	winter	40	--	40
2/7/94	38	winter	300	--	300
12/13/93	347	winter	300	--	300
4/12/93	102	winter	130	--	130
2/8/93	39	winter	20	--	20
12/14/92	349	winter	1100	0%	1100
4/6/92	97	winter	170	--	170
2/10/92	41	winter	800	--	800
12/9/91	343	winter	270	--	270
2/4/91	35	winter	500	--	500

Existing winter log mean = 274
Winter WQ standard for log mean (secondary contact recr.) = 1000
Explicit margin of safety (20%) = 200
Target value for winter log mean = 800
Winter log mean after reductions = 274

Existing winter 75th percentile = 650
Winter WQ standard for 75th %tile (secondary contact recr.) = 2000
Explicit margin of safety (20%) = 400
Target value for winter 75th percentile = 1600
Winter 75th percentile after reductions = 650

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0294.XLS

Summer (May-Oct) Fecal Coliform Data for Bayou Lafourche at Station 0111
Bayou Lafourche at Larose, Louisiana

Minimum fecal coliform count for applying reduction = 200

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
10/24/00	1025	summer	70	--	70
9/26/00	1020	summer	80	--	80
8/29/00	1020	summer	30	--	30
8/1/00	1020	summer	230	0%	230
6/27/00	1025	summer	800	0%	800
5/30/00	1035	summer	80	--	80
5/2/00	1025	summer	50	--	50

Existing summer log mean =	103	
Summer WQ standard for log mean (primary contact recr.) =		200
Explicit margin of safety (20%) =		40
Target value for summer log mean =		160
Summer log mean after reductions =		103
Existing summer 75th percentile =	155	
Summer WQ standard for 75th %tile (primary contact recr.) =		400
Explicit margin of safety (20%) =		80
Target value for summer 75th percentile =		320
Summer 75th percentile after reductions =		155

* Note: Reduction was applied only to observed data that were greater than 200 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0111.XLS

Winter (Nov-Apr) Fecal Coliform Data for Bayou Lafourche at Station 0111
Bayou Lafourche at Larose, Louisiana

Minimum fecal coliform count for applying reduction = 1000

Date	Time	Season	Observed FC Data (MPN per 100 mL)	Reduction Factor*	FC Data After Reduction (MPN per 100 mL)
11/28/00	1030	winter	50	--	50
4/4/00	1010	winter	80	--	80
2/29/00	0955	winter	50	--	50
2/1/00	1015	winter	50	--	50
1/4/00	1050	winter	110	--	110

Existing winter log mean =	64	
Winter WQ standard for log mean (secondary contact recr.) =		1000
Explicit margin of safety (20%) =		200
Target value for winter log mean =		800
Winter log mean after reductions =		64

Existing winter 75th percentile =	80	
Winter WQ standard for 75th %tile (secondary contact recr.) =		2000
Explicit margin of safety (20%) =		400
Target value for winter 75th percentile =		1600
Winter 75th percentile after reductions =		80

* Note: Reduction was applied only to observed data that were greater than 1000 (the log mean WQ standard) because it was not considered feasible to reduce fecal coliform counts that were already below the WQ standard.

FILE: R:\PROJECTS\2110-610\FC_DATA_0111.XLS